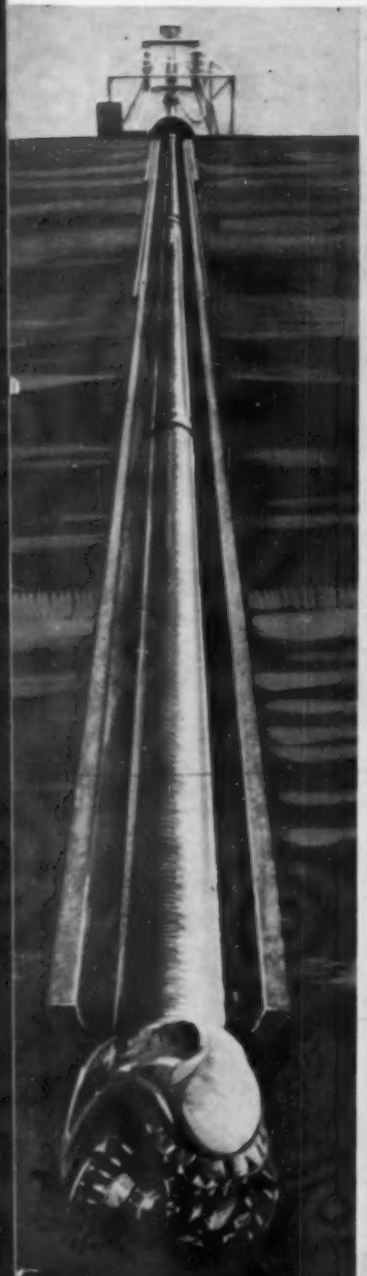
SEPT. 23 1960

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION



Drillers step up search for major cost-cutting tools 48

Socal plans marketing push 23
Better bits aid flexibility 35
Design governs rig mobility 40
Refiners seek purer hydrogen . 88
'Solid' lubes have limits 96
Prices vary for Sahara oil 98
Thin-wall pipe lowers costs ... 110
Can price cuts stop cuts? 116

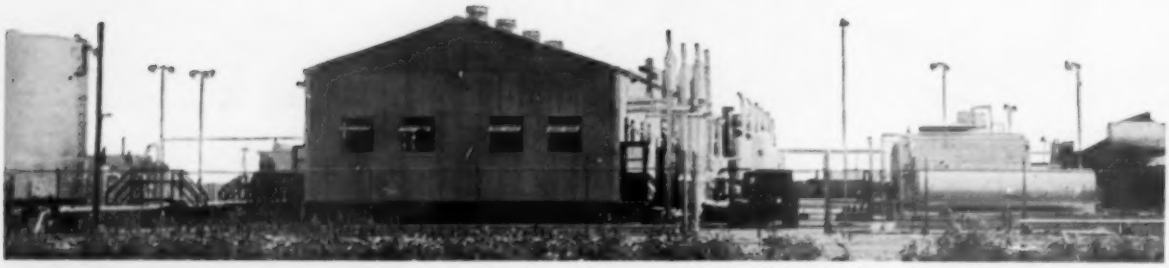
Price 50 Cents

UNIV MICROFILMS INC
EDITORIAL DEPT
313 N FIRST ST
ANN ARBOR MICH A

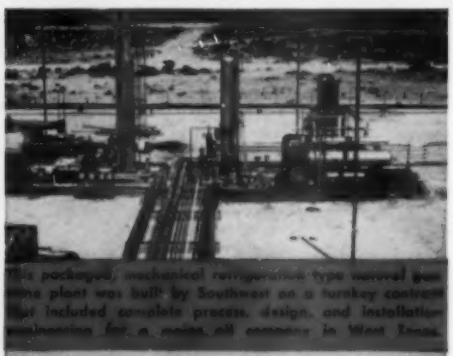
from drawing board to installation . . .

Southwest

specializes in TURNKEY operations



Southwest designed, engineered and installed this prefabricated water pumping station for a Pan American Petroleum Corporation unitized water-flooding operation in Southwest Texas.



This packaged, mechanical refrigeration type natural gas ... plant was built by Southwest on a turnkey contract that included complete process, design, and installation ... for a major oil company in West Texas.

This barge-mounted compressor station, including dehydration facilities and incorporating 1600 h.p. of compression in four units, is utilized in offshore gas boosting for ... CATC Division at Grand Isle, La.

... main line boosting for a major gas transmission company along the Texas Gulf Coast is this compressor station ... of four 660 h.p. packaged integral compressors, built complete on a turnkey contract.

Southwest incorporates engineered, pre-fabricated methods to install unitized facilities — *quicker and cheaper* — for the oil, gas and chemical industries on a turnkey basis. All are API-ASME code constructed.

Southwest's competent staff of mechanical, chemical and civil engineers—all registered as professional engineers with years of experience in this type work—can complete your project months ahead of field-constructed plants. Complete flexibility also enables Southwest to construct to your engineering requirements or to offer custom-designed plants FOB our shops for installation by others.

For the finest in design and operating efficiency, turn to Southwest for your next turnkey operation.

SOUTHWEST INDUSTRIES, INC.

P. O. Box 19188, Houston 24, Texas

PLANTS:
Houston, Texas
Calgary, Alberta, Canada
Mexico, D. F., Mexico

BRANCH OFFICES:
Midland, Texas
Tulsa, Oklahoma
New Orleans, Louisiana
Calgary, Alberta, Canada
Mexico, D. F., Mexico

SALES AGENCIES:
New York, New York
Detroit, Michigan
Chicago, Illinois
Los Angeles, California
Equipex, S. A., Caracas, Venezuela

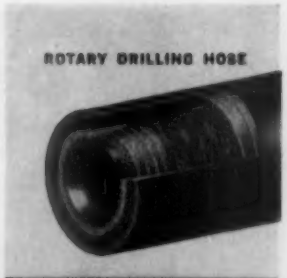
SUBSIDIARY COMPANIES:
Southwest International Corporation; Southwest Barber Ltd.; Industrias Southwest de Mexico, S. A.; Southwest Engineers, Inc.

Also designers, manufacturers and constructors of Packaged Compressors, Inert Gas Generators, CO_2 and H_2S Removal Units, H_2S Recovery Units and "Tenex" Exhaust Gas Injection Units.

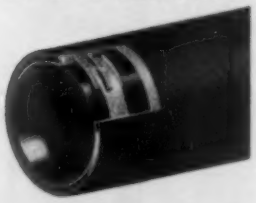
from bringing in the wells...

to keeping the home-fires burning

...the big name in hose is...



213-H TANK FILLER HOSE



Name your hose and Goodyear has it! Whether you're drilling for oil–refining or shipping it – or delivering it right to oil-users' homes – you'll find a Goodyear hose for the job.

For the types of hose shown here are only a sample of the complete Goodyear line. It includes a broad selection to cover every possible oil-handling need. Many of them are made with CHEMIGUM – the oil-resistant rubber developed by Goodyear. And every one is designed and built for easy handling and longer service.

Make sure your next hose is a Goodyear quality hose – by contacting your Goodyear distributor, or writing Goodyear, Industrial Products Division, Akron 16, Ohio.

GOODYEAR

THE GREATEST NAME IN RUBBER

Redwing, Chemigum—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Saves Time!

When you talk to the men of the First City National Oil and Gas Department about financing you can get to the point fast. These men are thoroughly experienced in production, refining, transportation and marketing – in petrochemicals, too. And because of their daily familiarity with complex financial problems, you can get a quicker decision. When time counts, that's important! Come in to see us.

SOON! First City National will be serving you in the newest, best equipped, most modern banking quarters in Texas.

FIRST CITY
NATIONAL BANK OF HOUSTON

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

PETROLEUM WEEK

Publisher—Ervin E. DeGraff
Editor—LeRoy Menzing

Managing Editor—Richard M. Machol
General News—Robert E. Spann, editor; J. Richard Shaner, Larry Christiansen, Jr., Doris D. Grandelis
Columnist & International Editor—Wanda M. Jablonski
Regional Editor—Glenn Green, Jr. (Houston)
Exploration, Drilling & Production—Ade Ponikvar, editor; Jim Bower
Processing & Petrochemical Editor—Rene J. Bender
Pipelines, Tankers & Storage Editor—Vincent W. De Salvo
Foreign News—Georgia Macris, Frederic J. Cassin
Marketing Editor—Robert L. Siegel
Market Trend—Halsey Peckworth
District Editors
Dallas—Marvin Reid *Tulsa*—Jim Mayes *Bakersfield*—William Rintoul
Houston—Eugene Bush *Chicago*—Stewart Ramsey *Los Angeles*—Kemp Anderson
Presentation—William A. Caperell, director; Mildred Schutte
Editorial Assistants—Dorothy Miller (Chicago), Carole A. Masucci, Phyliss Lipman
Librarian—Helen T. Schaefer **Reprint Service**—Rita Feeney
Domestic News Service
Chicago Bureau—Bruce Cross, Sheila Rowe
Cleveland Bureau—Arthur Zimmerman, chief; Violet Forsha
Dallas Bureau—Mary Lorraine Smith, Mae Brown
Detroit Bureau—Donald MacDonald, chief; Sally Ayling, Wesley Perry, Jr.
Los Angeles Bureau—Michael Murphy, Marvin Petal
San Francisco Bureau—Jenness Keene, chief; Donald Winston, Alison Lunt
Washington Bureau—George B. Bryant, Jr., chief; Glen Bayless, Dean Reed, D. O. Loomis, Roy Calvin, Seth Payne
Correspondents: Anchorage, Austin, Baton Rouge, Billings, Bismarck, Calgary, Casper, Cheyenne, Corpus Christi, Denver, Edmonton, Evansville, Farmington, Ft. Worth, Midland, Mobile, Montreal, New Orleans, Odessa, Oklahoma City, Ottawa, Philadelphia, Pittsburgh, Regina, Salt Lake City, Seattle, Shreveport, Toronto, Vancouver
Foreign News Service
Middle East Bureau—Onnic Marashian, chief
Caracas Bureau—John Pearson, chief
Bonn Bureau—Pete Forbath, chief; Silke McQueen, Jim Morrison, Helga Berendt
London Bureau—John Shinn, chief; John Tunstall, George Bull
Mexico City Bureau—Peter Weaver, chief; Lourdes Marin
Moscow Bureau—Ernest Conine, chief
Paris Bureau—Robert E. Farrell, chief; Helen Avati, Arthur Erikson
Tokyo Bureau—Sol Sanders, chief; John Yamaguchi, Haruko Hosono
Correspondents: Amsterdam, Ankara, Bogota, Bombay, Brussels, Buenos Aires, Cairo, Djakarta, Geneva, Guatemala City, Havana, Karachi, La Paz, Lima, Manila, Melbourne, Rabat, Rangoon, Rio de Janiero, Rome, San Jose, Teheran, Vienna
Manager, McGraw-Hill World News Service—John Wilhelm; Margaret Ralston, managing editor
Economics Staff—Dexter M. Keezer, director; Douglas Greenwald
Business Department: *Advertising Sales Manager*—Donald R. Thompson; *Business Manager*—John E. Thompson; *Western General Manager*—Donald O. Hanson; *Circulation Manager*—Harriet Costikyan; *Promotion Manager*—N. F. Cullinan; *Research Manager*—Leo M. Murray; *Advertising Makeup*—P. J. Callahan
Other McGraw-Hill Petroleum Publications
NATIONAL PETROLEUM NEWS PLATT'S OILGRAM NEWS AND PRICE SERVICES

PETROLEUM WEEK

SEPTEMBER 23, 1960
Vol. 11, No. 12

Published weekly by McGraw-Hill Publishing Co., Inc. James H. McGraw (1860-1948), founder. Publication office: 871 N. Franklin St., Chicago 10, Ill. See panel below for directions regarding subscriptions or change of address.

Executive, Editorial, Circulation and Advertising offices: 330 W. 42nd St., New York 36, N. Y. **Officers of the Publications Division:** Nelson L. Bond, President; Shelton Fisher, Wallace F. Traendly, Senior Vice Presidents; John R. Callaham, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising Sales; A. R. Venezian, Vice President and Circulation Coordinator. **Officers of the Corporation:** Donald C. McGraw, president; Joseph A. Gerardi, Hugh J. Kelly, Harry L. Waddell, Executive Vice Presidents; L. Keith Goodrich, Vice President and Treasurer; John J. Cooke, Secretary.

Subscriptions are solicited only from executives, supervisors, and technically trained personnel in the oil and natural gas industries, who are engaged in exploration, drilling, producing, processing, petrochemical manufacture, transportation, or wholesale marketing. **Position and company connection must be indicated on subscription orders.** Subscription rates for all countries: $5 per year. Single copies 50¢. Second class postage paid at Chicago, Ill. Printed in the U.S.A. Title registered in U.S. Patent Office. © Copyright 1960 by McGraw-Hill Publishing Co., Inc. All rights reserved.

Unconditional guarantee: Our primary aim is to provide subscribers with a useful and valuable publication. Any comments or suggestions for improvement will be most welcome. On written request from any subscriber, the publisher agrees to refund the unused portion of the subscription price.

Subscriptions: Address subscription correspondence and change of address to Fulfillment Manager, Petroleum Week, 330 W. 42nd Street, New York 36, N. Y. On address changes please give old and new addresses and zone numbers, if any, and enclose an address label from a recent issue if possible. Please allow one month for change to become effective.

Postmaster: Please send form 3579 to Petroleum Week, 330 W. 42nd St., New York 36, N. Y.

INSIDE *Slant*

WHY NOT MANAGE?

This may be putting it bluntly, BUT . . .

How can oil industry management feel it is doing a good job when it continually reports that all departments operated at a profit except refining and marketing, whose income was reduced due to "disastrous competitive markets"?

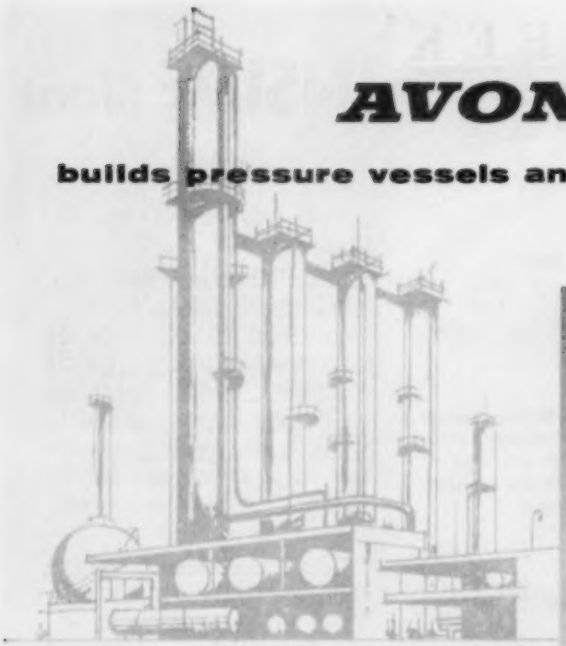
The question of supply and demand seems very simple to management in all industries except oil. The steel industry always drops its production when demand declines. The same is true of some other industries, where production is curtailed or halted when inventories get out of line.

It seems to be a very simple arithmetic problem.

If you had a group of hens that were laying 100 eggs per day and your market would take only 90 at the normal price, and the surplus had to be sold at a discount, then why not reduce the layers. That would cut the supply, and keep the price of eggs on a profitable basis.

Not only would you save on the feed bill, but you could eat the surplus hens, have an enjoyable meal, and still be money ahead.

LeRoy Menzing
EDITOR

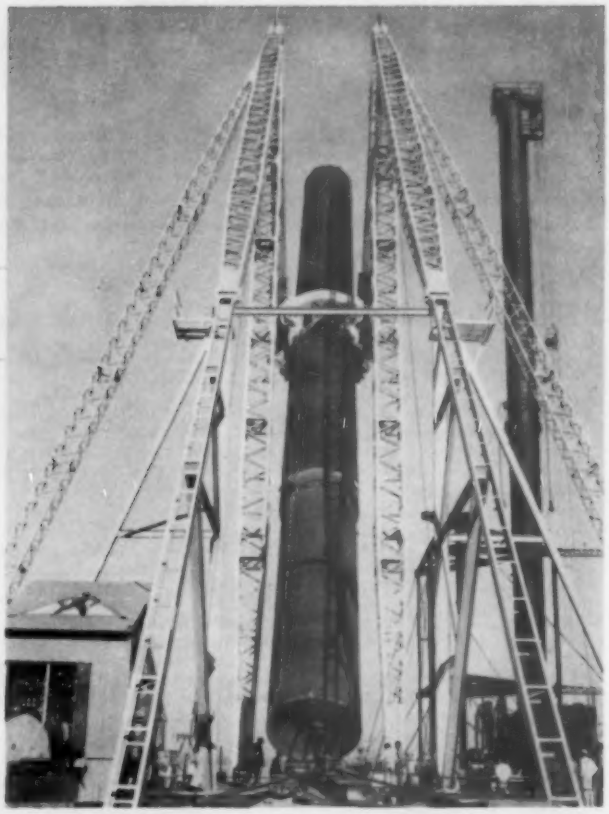


AVONDALE

builds pressure vessels and fabricated steel products

From its strategic location on the Mississippi River Avondale can build and ship pressure vessels and fabricated products of a size and weight to suit almost any job requirement.

Avondale invites your inquiry regarding your particular needs in this specialized field of steel fabrication.



600 ton lift at Main Yard on the Mississippi River

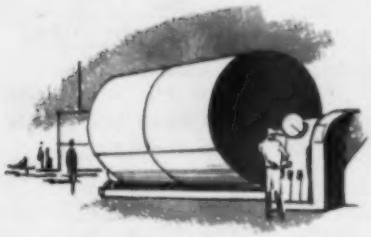
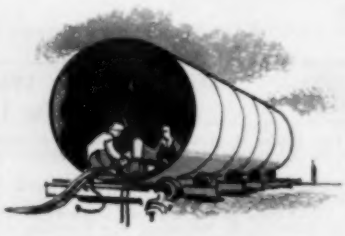
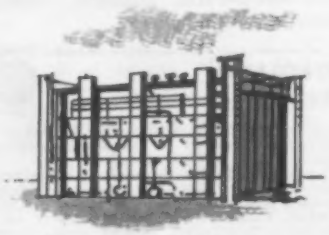


Plate rolls will accept any thickness up to 4½"



Automatic welding of longitudinal seam in pressure vessel

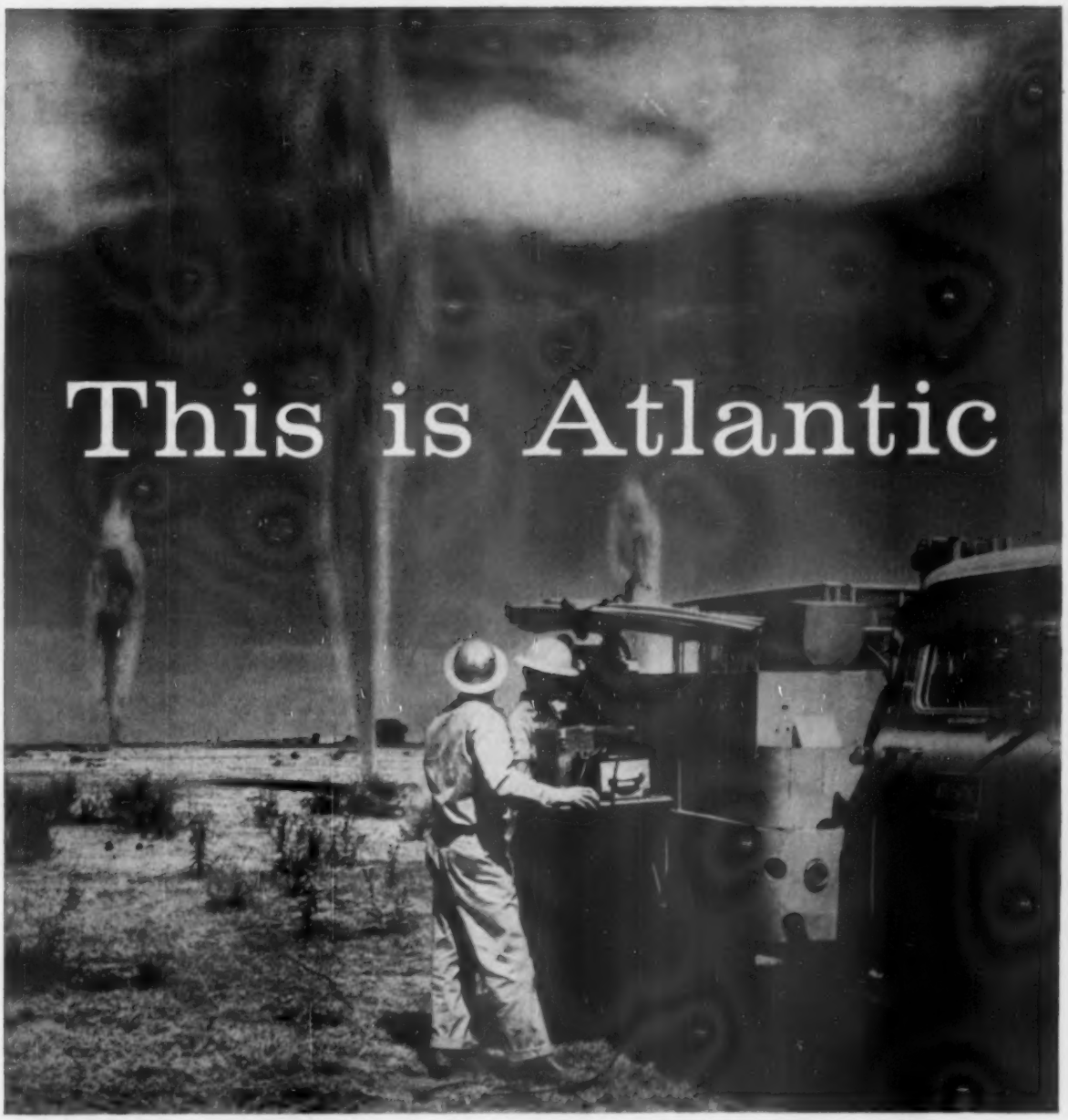


Stress relieving furnace with temperatures up to 2100° F.

INDUSTRIAL DIVISION
AVONDALE SHIPYARDS, INC.

FORMERLY AVONDALE MARINE WAYS, INC.

P. O. BOX 1030 • PHONE UNiversity 6-4561 • NEW ORLEANS 8, U.S.A.



PRODUCTION: Atlantic searches for oil...actively developing new sources of crude across America and other parts of the world to meet future needs for quality gasolines, heating oils, lubricants, waxes, heavy fuels, asphalts, petrochemicals and jet fuels. Look to Atlantic to continually serve industry with high-quality products at lowest possible cost.

ATLANTIC

THE ATLANTIC REFINING COMPANY

Producer, refiner and marketer of quality petroleum products

Congrats and $25 to R. STROHMEYER, J. M. Huber Corp., Borger, Texas

When it comes to blowing our own horn . . . We believe it is done best by delivering pipe of quality, stamina and dependability. Lone Star, the oil country's own steel mill . . . does just that on a round-the-clock basis.

The Lone Star plant embodies the most advanced techniques in making casing, tubing, and line pipe to exacting API specifications.

Neighbor, wherever you are, specify Lone Star and we both get a good deal.

© 1956 Lone Star Steel Company

Lone Star STEEL COMPANY

EXECUTIVE—SALES OFFICES
W. Mockingbird Lane at Roper • P. O. Box 12226 • Dallas, Texas
DISTRICT SALES OFFICES
912 Republic National Bank Building, Dallas, Texas
Houston, Texas | Midland, Texas | Tulsa, Oklahoma

Views That

Dear Sir:

It was a pleasant surprise to learn that my letter to you [PW—Apr. 25'58,p69] prompted B. W. Blanpied to make a study that resulted in a paper titled "Trends in Exploration Methods Based on Statistics from Study of Location of New Field Wildcat Wells" [PW—Aug.26'60,p8].

Apparently, the referenced letter also helped to convince geologist Tom Culbertson, Union Oil Co. of California, that exploratory drilling statistics were misleading: Culbertson quoted a portion of the letter to the last national meeting of the AAPG.

The oil industry is, I feel, indebted to Blanpied and Culbertson for taking a closer look at statistics, which, taken at face value, tend to cast an adverse reflection on the ability of subsurface geologists.

Needless to say, the referenced letter also resulted in some unpleasant reactions among local geologists because they, like Culbertson, interpreted my remarks to be an indictment of geologists rather than statistics. To the contrary, the letter was motivated by the conviction that the statistics were not only misleading but were based upon questionable data. I am in defiance of the growing contention that a wildcat prospect must be supported by geophysics in order for it to be labeled a first class prospect; however, if management is not to be deceived, it will only be because geologists like Blanpied and Culbertson have set the records straight.

CHARLIE R. GREGORY
Division landman
Crown Central Petroleum Corp.

Dear Sir:

Oil exploration and production is one of the major industries and necessities of our nation. But in published works of the law, I fail to find one very important point separately and properly entitled and listed and digested, and that is the use—or the possibility of use—of secondary oil recovery methods such as vacuum or gas pressure or waterflooding of oil-bearing sands as constituting further development of oil and gas leases under the prudent operator rule.

Most court decisions, and most authors on the subject, hold in effect that further drilling of either additional wells or to deeper sands is what is meant by such further development.

But lease operators have been using

Make News

secondary recovery methods for years (waterflooding for about 40, and vacuum and gas pressure about 15-20 years). In fact, such waterflooding is a major industry within the oil recovery industry. We therefore feel that you and experts (authors) on the subject should give secondary recovery methods, and particularly waterflooding, separate listings and headings in presenting what constitutes further development under the prudent operator rule. Apparently the law experts have not kept up with the lease operators. But there have been several court decisions holding in effect that waterflooding as a secondary oil recovery method is a proper point for consideration as to what constitutes further development under this rule in litigation brought to cancel undeveloped portions of such leases . . .

JOHN M. PORTER, JR.
Porter & Porter
Muskogee, Okla.

Dear Sir:

Your article pertaining to the visit of American oil executives to Russian oil fields and refineries, "Soviets Are Ready to Return the Visit" [PW—Sept. 9'60,p13] brings a thought that must have run through the minds of each expert: "Why didn't I learn a bit of the Russian language before I came here?" I am sure that had they possessed this, they would have put some serious doubts, and possibly even changed their hosts minds about their accomplishments.

EDWARD I. BLEE
Glenland Heights, Ohio

"It is not the producer who benefits directly by [percentage] depletion —he merely puts it back into the ground in search for more oil. It is the consumer who realizes a direct benefit by having available to him an assured and competitive supply."

—ALVIN C. HOPE
President
Independent Petroleum Assn. of America

PETROLEUM WEEK *will publish each week comments from readers on timely, pertinent subjects. Such expressions are welcome.*

Address all such correspondence to LeRoy Menzing, Editor, PETROLEUM WEEK, *330 W. 42nd St., New York 36, N.Y.*

GEM
OF THE
OIL AND GAS
INDUSTRY

Lone Star line pipe is the top "fashion" in the oil and gas country. Made to exacting API specifications . . Lone Star pipe is an outstanding example of fine craftsmanship in steel.

Field-proved year after year, fully normalized and with bendability that easily adapts to rugged terrain . . Lone Star pipe is called the gem of the oil and gas industry by pipeliners everywhere.

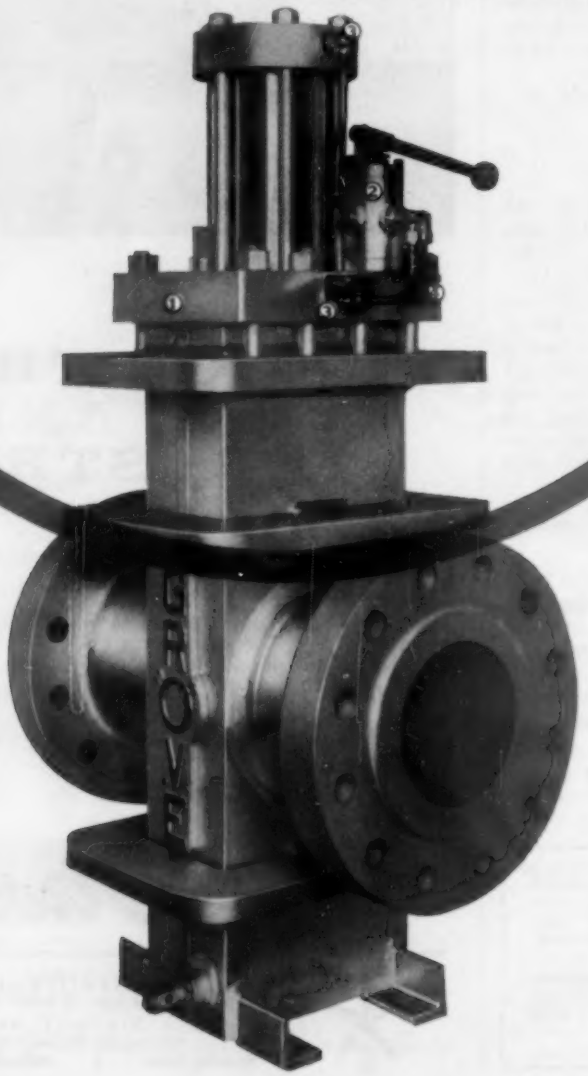
Lone Star STEEL COMPANY

EXECUTIVE—SALES OFFICES
W. Mockingbird Lane at Repor • P. O. Box 12226 • Dallas, Texas
DISTRICT SALES OFFICES
912 Republic National Bank Building, Dallas, Texas
Houston, Texas | Midland, Texas | Tulsa, Oklahoma

NEW! A GROVE CYLINDER OPERATOR FOR GROVE G-4 VALVES

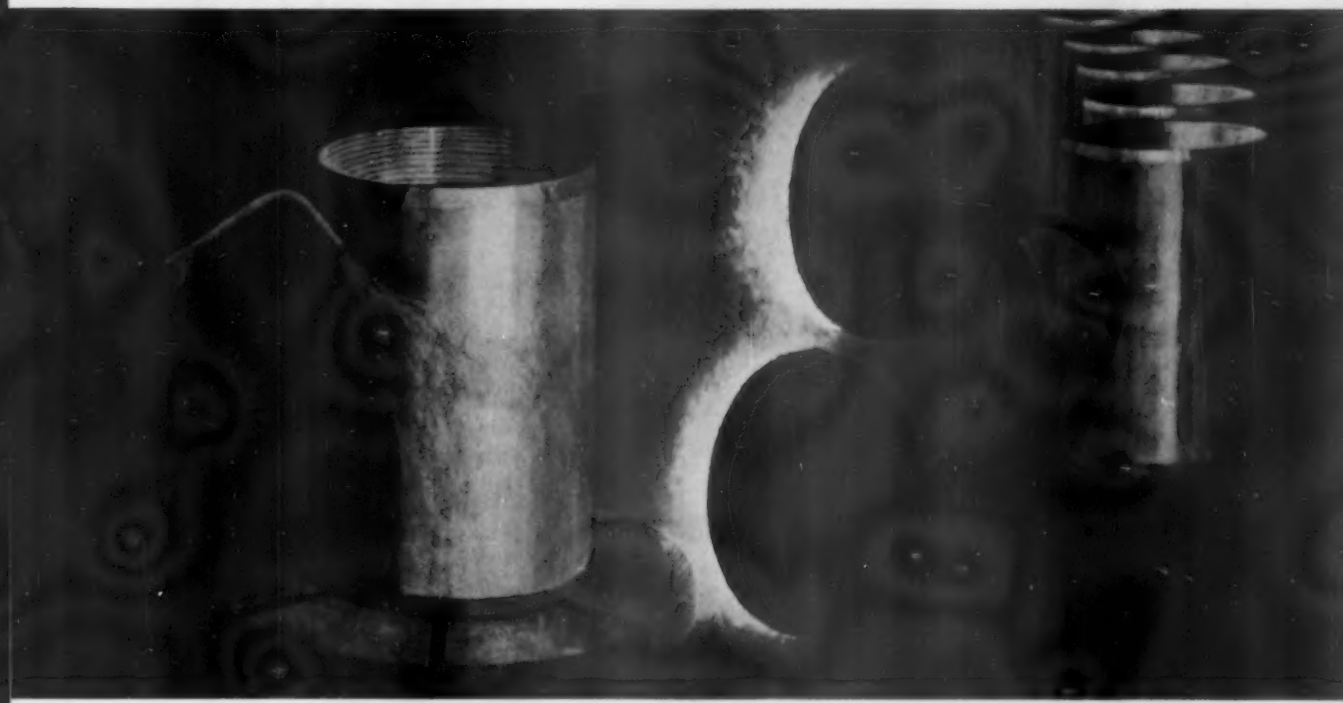
Now from one source, Seal-"O"-Ring® gate valves with an extremely compact cylinder operator. With fewer parts than conventional units, the operator's reduced size is achieved through designing the valve stem to act also as a piston rod, bringing the cylinder very close to the valve bonnet (1). In some sizes, the valve bonnet actually becomes the lower cylinder head of the operator. The operator comes equipped with a specially designed four-way valve (2) which controls the cylinder. Utilizing line pressure, fluid is applied to either end (3) moving the piston and gate to the open or closed position. A variable orifice (4) in the discharge controls operating speed. Designed for general pipeline service, where ease of operation and/or remote control is necessary.

GROVE PIPELINE VALVES **GROVE VALVE and REGULATOR COMPANY**
a subsidiary of Walworth
6529 Hollis Street, Oakland 8, California
Offices throughout the U.S. and in Western Canada



Look what's getting the 3rd degree

Illuminated by the weird glow of two powerful ultraviolet lamps, this casing coupling is sweating out a check for possible imperfections. It's a process known as Magnaglo inspection. Here a special-clearance coupling is being inspected.



The coupling is magnetized; then drenched with a reddish-brown solution that contains magnetic particles coated with fluorescent dye. If there is a surface defect on the coupling, fluorescent particles cling to it—held by the magnetic field which builds up around any imperfection in the steel.

The inspector then slowly rotates the coupling on a potter's wheel. He scans it carefully for any tell-tale gleam that clearly indicates an imperfection.

Magnaglo inspection is only one of the many quality control methods used by National Tube during the production of USS National Seamless Oil Country Tubular Products. If you've got a tough oil country tubular problem, write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

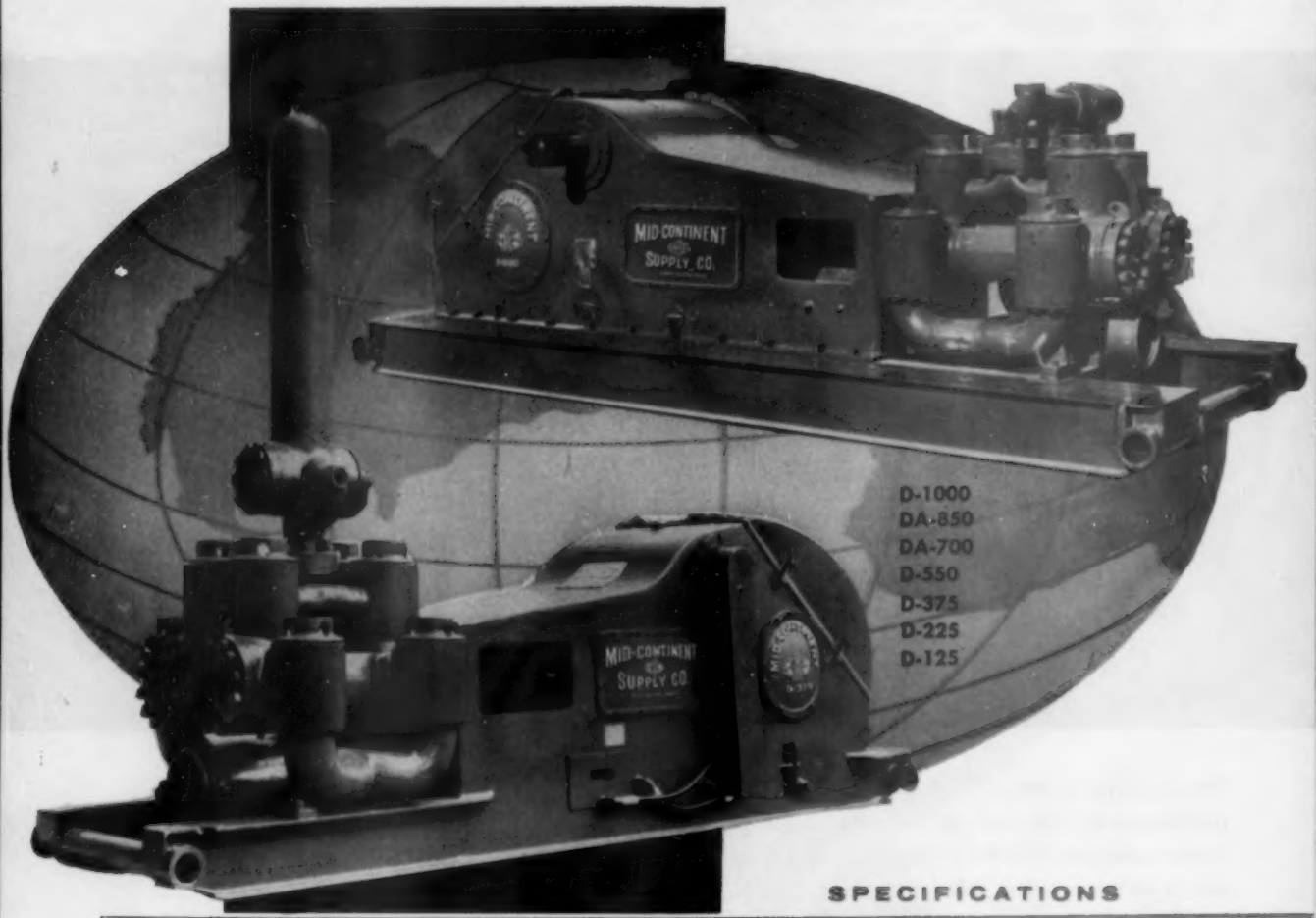
USS and National are registered trademarks

USS **National Tube Division of United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

FOR DRILLING OPERATIONS ANYWHERE IN THE WORLD THERE IS A Mid-Continent Emsco Slush Pump

...Seven Slush Pumps to match



SPECIFICATIONS

	D-125	D-225	D-375	D-550
Maximum Liner Size by Stroke	7¼" x 10"	7¼" x 12"	7½" x 14"	7½" x 16"
Piston Rod—Diameter and Taper	1¾"—3 API	1⅞"—4 API	2"—4 API	2¼"—6 API
Fluid End Test Pressure	3500 psi	3500 psi	4000 psi	6000 psi
Suction Manifold	8" Female	8" Female	10" Male	10" Male
Discharge Manifold	3" Female	3" Female	4" Female	4" Female
Gear Ratio	4.96:1	5.43:1	5.04:1	5.04:1
Gear Face	5"	9"	11¼"	13"
Pinion Shaft Extension (Clear)	9¼"	9¾"	12¾"	15¼"
Bearing	Roller	Roller	Roller	Roller
Keyway	1" x ½"	1" x ½"	1¼" x ⅝"	1½" x ¾"
Eccentric Drive Bearings	Roller	Roller	Roller	Roller
Main Shaft Bearings	Self Align	Self Align	Self Align	Self Align
Crosshead Bearings	Double Needle Roller	Double Needle Roller	Double Needle Roller	Double Needle Roller
Length—Overall	11'—2"	12'—6"	14'—8"	16'—8"
Width				
Overall—Inc. Shaft Ext.	4'—¼"	4'—1⅛"	4'—8"	6'—8⅛"
Fluid End	3'—8½"	3'—8½"	4'—1"	4'—6½"
Power End—Inc. Shaft Ext.	4'—¼"	4'—¼"	4'—4¹¹⁄₁₆"	6'—5⅜"
Skid	3'—3½"	3'—7⅝"	3'—6¾"	6'
Height—Less Air Chamber	3'—9"	4'—¼"	4'—9"	5'—4¼"
Approximate Weight	8,700 lbs.	13,000 lbs.	18,300 lbs.	29,000 lbs.

EXPANDING

THE MID-CONTINENT LINE OF DRILLING MACHINERY

DESIGNED FOR THE JOB

your exact power, pressure and volume requirements

Pioneered by Mid-Continent Supply Co. since 1938 throughout the oil fields of the world, this line of all steel, roller bearing pumps assures fastest penetration under all types of drilling conditions. A complete range of sizes to cover minimum and maximum conditions enables the user to select a pump to meet the exact job . . . expertly designed for light-weight, easy maintenance, durability and dependability. And Mid-Continent backs these pumps with fast, dependable field service from strategically located parts and service centers.

For assistance in selecting a Mid-Continent Emsco pump for your exact requirements, contact your nearest Mid-Continent representative.

MID-CONTINENT — SUPERMARKET FOR THE OIL INDUSTRY

DA-700	DA-850	D-1000
8¼" x 16"	8¼" x 18"	8¼" x 18"
2¾"—6 API	3"—6 API	3"—6 API
6000 psi	6000 psi	6000 psi
10" Male	12" Male	12" Male
4" Female	4" Female	4" Female
5.05:1	5.03:1	4.76:1
14"	16"	18"
14"	15"	15"
Roller	Roller	Roller
1½" x ¾"	1½" x ¾"	1½" x ¾"
Roller	Roller	Roller
Self Align	Self Align	Self Align
Double Needle Roller	Double Needle Roller	Double Needle Roller
18'—4⅞"	20'—2"	20'—2"
7'	8'	8'
4'—8½"	6'—6"	6'—6"
6'—7¾"	6'—4¼"	6'—4¼"
7'	8'	8'
6'	6'—4½"	6'—6"
37,500 lbs.	48,800 lbs.	50,500 lbs.

PERFORMANCE DATA

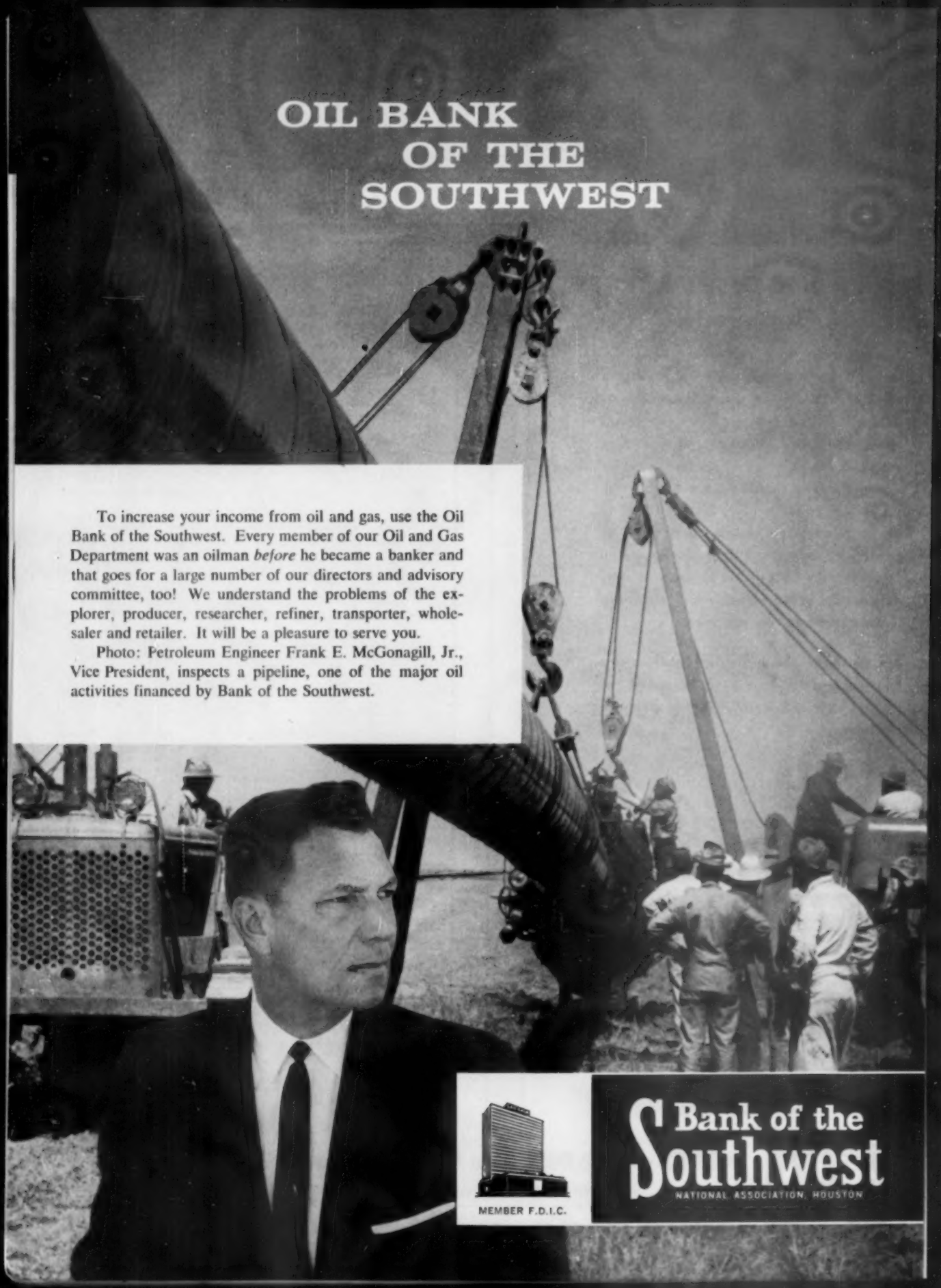
	Strokes Per Min.	Max. H.P. Input	Operating Data	LINER SIZE										
D-1000				8¼"	8"	7¾"	7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾"
	60	1000	G P M Output	933	874	817	760	706	653	603	553	507	462	419
	50	833	G P M Output	778	728	680	633	588	543	503	461	423	385	349
	40	667	G P M Output	622	582	544	506	470	434	402	369	338	308	279
			Gallons per Revolution	15.56	14.57	13.59	12.66	11.75	10.86	10.06	9.22	8.45	7.71	6.99
			Max. Disch. Pressure	1669	1668	1702	1917	2068	2229	2419	2664	2971	3133	3480
DA-850				8¼"	8"	7¾"	7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾"
	60	850	G P M Output	933	874	817	760	706	652	603	553	507	463	419
	50	708	G P M Output	778	728	680	633	588	543	503	461	423	385	349
	40	567	G P M Output	622	582	544	506	470	434	402	369	338	308	279
			Gallons per Revolution	15.56	14.57	13.59	12.66	11.75	10.86	10.06	9.22	8.45	7.71	6.99
			Max. Disch. Pressure	1329	1418	1518	1630	1758	1896	2056	2340	2602	2990	3056
DA-700				8¼"	8"	7¾"	7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾"	5½"
	55	700	G P M Output	909	852	796	742	690	640	591	544	499	456	414	374
	45	592	G P M Output	769	721	674	628	584	541	500	460	422	386	350	317
	35	485	G P M Output	630	590	551	514	477	443	408	377	345	316	287	259
			Gallons per Revolution	13.99	13.10	12.25	11.43	10.61	9.84	9.09	8.37	7.68	7.02	6.37	5.76
			Max. Disch. Pressure	1120	1197	1301	1376	1479	1598	1734	1878	2044	2236	2469	2727
D-550				7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾"	5½"	5¼"	5"	4¾"
	55	550	G P M Output	751	699	649	600	552	508	464	423	383	346	309	275
	45	405	G P M Output	626	582	540	500	460	420	383	350	315	283	252	223
	35	381	G P M Output	520	484	449	415	382	348	321	292	260	230	214	189
			Gallons per Revolution	11.56	10.76	9.98	9.23	8.51	7.83	7.14	6.51	5.90	5.32	4.76	4.23
			Max. Disch. Pressure	1067	1146	1235	1326	1440	1577	1727	1894	2080	2317	2560	2818
D-375				7½"	7¼"	7"	6¾"	6½"	6¼"	6"	5¾"	5½"	5¼"	5"	4¾"
	70	375	G P M Output	723	674	626	581	536	494	472	434	376	341	307	276
	60	321	G P M Output	620	577	537	498	460	423	405	358	323	292	263	235
	45	241	G P M Output	465	433	403	373	345	319	303	266	242	219	197	176
			Gallons per Revolution	10.329	9.626	8.948	8.294	7.663	7.056	6.743	5.913	5.378	4.867	4.379	3.915
			Max. Disch. Pressure	744	810	871	930	1018	1104	1156	1316	1451	1600	1777	1961
D-225				7½"	7"	6¾"	6½"	6¼"	6"	5¾"	5½"	5¼"	5"	4¾"	4½"
	70	225	G P M Output	580	536	500	463	426	391	357	325	295	265	237	211
	60	193	G P M Output	497	460	429	396	365	335	306	279	253	227	203	180
	45	145	G P M Output	373	347	321	297	274	251	229	209	189	171	153	136
			Gallons per Revolution	5.265	4.706	4.143	3.682	3.089	2.585	2.194	1.846	1.548	1.299	1.079	0.915
			Max. Disch. Pressure	885	967	984	1099	1199	1338	1518	1707	1911	2134	2370	2651
D-125				7½"	7"	6¾"	6½"	6¼"	6"	5¾"	5½"	5¼"	5"	4¾"	4½"
	85	125	G P M Output	390	357	306	471	434	399	365	333	301	271	243	216
	70	103	G P M Output	486	450	416	386	357	329	300	273	248	223	200	178
	55	81	G P M Output	382	351	320	305	281	258	236	215	195	176	157	140
			Gallons per Revolution	6.940	6.456	5.988	5.520	5.104	4.698	4.296	3.906	3.540	3.192	2.860	2.540
			Max. Disch. Pressure	308	336	357	395	419	456	499	548	604	670	742	840

MID-CONTINENT SUPPLY CO.

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

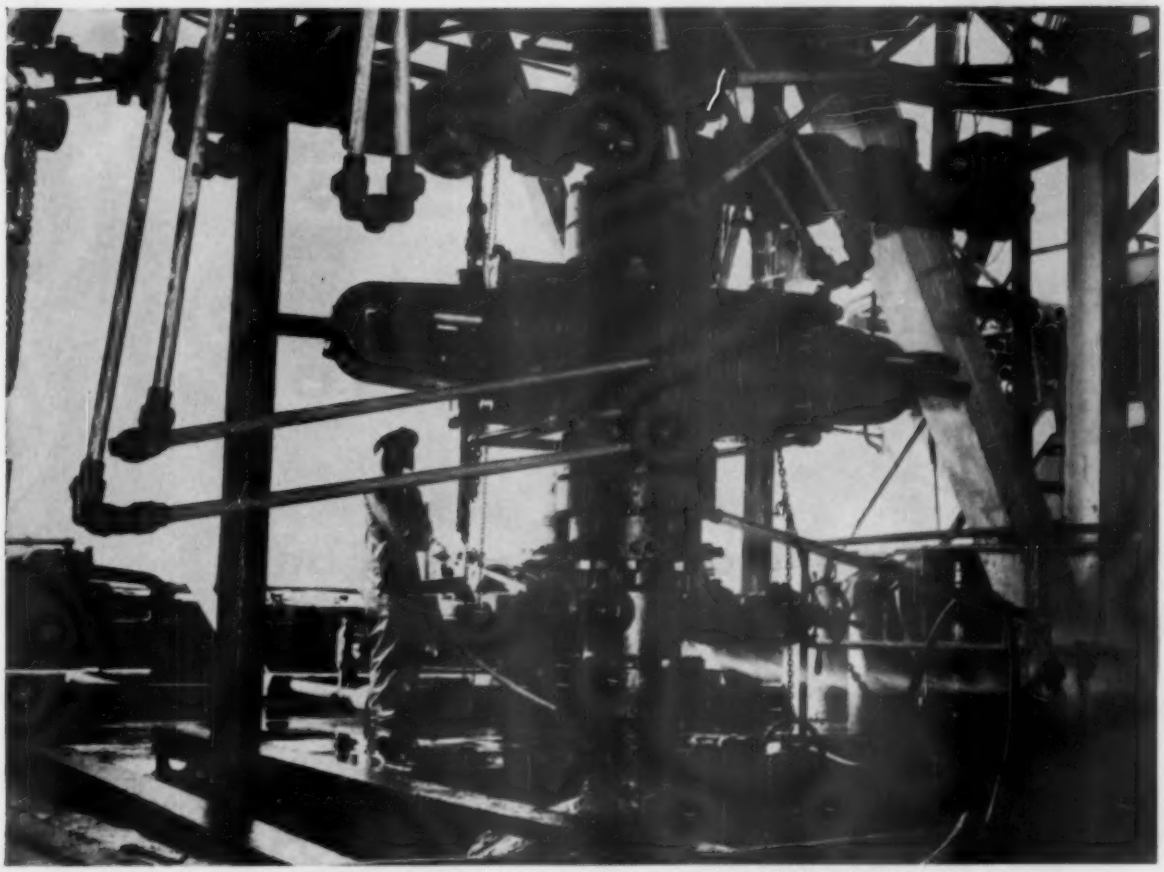
Mid-Continent Building, Fort Worth, Texas • Export Division: 45 Rockefeller Plaza, New York 20, N.Y. Cable: MIDCUMPORT NYK

SP2-0


OIL BANK
OF THE
SOUTHWEST
To increase your income from oil and gas, use the Oil Bank of the Southwest. Every member of our Oil and Gas Department was an oilman *before* he became a banker and that goes for a large number of our directors and advisory committee, too! We understand the problems of the explorer, producer, researcher, refiner, transporter, wholesaler and retailer. It will be a pleasure to serve you.
Photo: Petroleum Engineer Frank E. McGonagill, Jr., Vice President, inspects a pipeline, one of the major oil activities financed by Bank of the Southwest.
MEMBER F.D.I.C.
Bank of the Southwest
NATIONAL ASSOCIATION, HOUSTON

ON BLOWOUT PREVENTER LINES–

Chiksan Swivel Joints insure high safety factor



Chiksan Joints and Weco Unions on blowout preventer lines in offshore operations in Galveston Bay.

Convincing proof that Chiksan Swivel Joints measure up under severe conditions is shown in the following destruction test report: "In open flame trials, Chiksan Swivel Joints, under pressure of 1800 PSI, were subjected to flames reaching 650°F. The Swivel Joints functioned satisfactorily for a full 60 minutes—55 minutes longer than the time deemed necessary for the effective operation of the blowout preventer."

In foul weather and in rough handling Chiksan Joints stand up best. Long service life and minimum maintenance are other major reasons for selecting Chiksan.

Standardize on Chiksan Swivel Joints for all your drilling and production needs. You'll find Chiksan Joints and their partner Weco Unions in major supply stores everywhere.

CHIKSAN fmc

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

#60-50

CHIKSAN COMPANY—Brea, California • Chicago 5, Ill. • Newark 2, N. J. • Divisions: Chiksan International, Homer Valves, Weco • Subsidiary: Chiksan of Canada Ltd.

New steels are born at Armco

from vending to mending . . .

Sheffield has the right bolts

Making things or repairing things, there's a Sheffield bolt for every purpose. Manufacturers of vending machines use Sheffield bolts. So do makers of thousands of other products. So do farmers and do-it-yourselfers.

Sheffield bolts are a vital part of railroads. They travel the highways in cars and trucks. They fasten machinery and rigs in the oilfields, and ride the air-lanes in jet aircraft. They go down to the sea in ships, and are on the job at home in appliances and power mowers.

Wherever the need is for steel bolts, Sheffield delivers the right bolt, right when it's needed. That takes a lot of skill and productive capacity. That's what you get from one of the world's largest bolt plants, where bolts are made and quality-controlled by Sheffield, from furnace to finished product.

You name the need. Sheffield has the bolt. Standard, special, or custom-made to specifications. Get in touch with your Sheffield Man.

SHEFFIELD

ARMCO

BOLT PRODUCTS

SHEFFIELD DIVISION

Sheffield Plants in Kansas City, Tulsa and Houston

ARMCO

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

"Oilwell" 96 Draw Works with 2000 hp built-in electric drive

The unique conversion pictured above enabled a prominent "Oilwell" 96 user to change his standard 96 draw works to ultra-modern electric drive.

This rear draw works view shows the compact installation of two duplicate 1000 hp direct-current gear-motors. One motor, coupled to the high and clutched to the low drive shaft, rests in the center compartment formerly occupied by the independent transmission, while the other motor at right is coupled to the low drive shaft. There is no increase in draw works width with only a 4'6" extension at the driller's end.

The arrangement provides maximum flexibility and a wide speed-torque range for hoisting, rotating, or a combination of both. Pumps on the rig have independent motor drives.

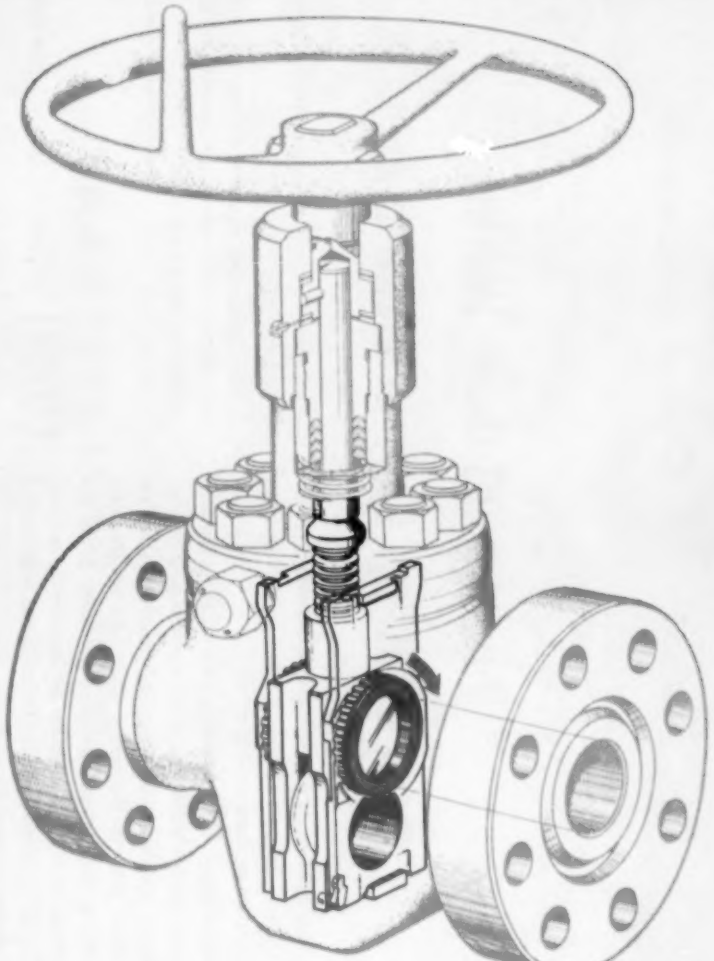
This is another example of how our modern facilities and engineering experience combine to give "Oilwell" customers what they want.

USS and "Oilwell" are registered trademarks

USS Oil Well Supply Division of United States Steel

Executive Offices—Dallas, Texas
Export Office—30 Rockefeller Plaza, New York 20, N. Y.

OPEN-CLOSE-OPEN-CLOSE-OPEN-CLOSE-OPEN-CLOSE-



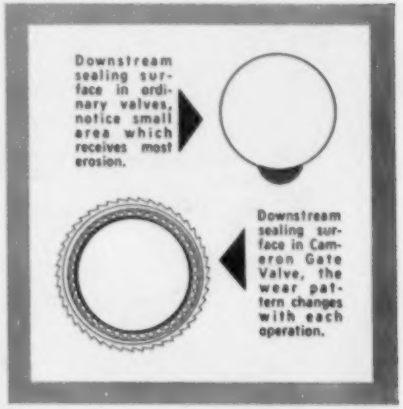
VALVE COST CLUE

The maze of costs connected with the average valve for API service requires more than a clue for a clear understanding, but here is one salient fact applicable to all.

Any API valve serves only one purpose — to open and close the line. The actual cost of the valve is the cost per operating cycle during its useable life multiplied by the number of times it is operated. For a true picture, the average operating cycle cost must include purchase price, all maintenance and repair.

The Cameron Type "F" Gate Valve offers the most operating cycles for the least money — the reason is its exclusive rotating-seat principle, the biggest advancement in API valve design today. With each operation sealing surfaces are changed and wear is spread over the entire contact area. Valve life is extended tremendously.

If you plan, recommend or purchase valve installations for API service you'll want more than a clue to costs — call the nearest Cameron Representative, he can


Downstream sealing surface in ordinary valves, notice small area which receives most erosion.
Downstream sealing surface in Cameron Gate Valve, the wear pattern changes with each operation.

give you complete details on Cameron Type "F" Gate Valves and their "lowest cost operation."

Cameron

IRON WORKS, Inc.

P. O. Box 1212 — Houston, Texas

Export Office: 7912 Empire State Bldg., New York City. In England: Cameron Iron Works Ltd., 76 Grosvenor St., London W.1, England

60-Second Summary / WHAT'S HAPPENING IN OIL

September 23, 1960

dept/INDEX

Production	35
Pipelines	110
Processing	88
Marketing	116
Washington	30
Statistics	107
The Market Trend	108
Key Prices	109
Editorial	124
International	98
Personals	122
Service & Equipment	120

Despite inefficiency, the Soviet Union will meet its petroleum goals, a U.S. expert who visited Russia says. The planned exchange visit of Russians to the U.S. may be canceled by the State Dept., after Soviet charges of spying. . . . p. 25

•

New tools, techniques, and operating procedures are helping drilling contractors combat their problems. A look at accomplishments, and what's ahead, is contained in a Petroleum Week Special Report. . . . p. 48

•

Standard Oil Co. of California is the latest major to unveil a consolidation plan. Operations east of the Rockies are being reorganized, but many details are yet to be worked out. . . . p. 23

•

The latest in refinery techniques: Upgrading of recycle gas to obtain purer hydrogen for processing. A low-temperature separation method makes the technique economical, and is now being offered to the industry. . . . p. 88

•

International majors in France are faced with a crazy-quilt pattern of purchase prices for Sahara crude. The cut in Middle East postings, and the many formulas used in contract negotiations, have resulted in many price variations. . . . p. 98

•

Mobil Oil Co.'s wide-area pricing plan is being challenged in Rhode Island. Mobil has dropped its price throughout the state, but oil men wonder whether the move will encourage or discourage price wars. . . . p. 116

•

Thin-wall pipe is catching on fast in the pipeline industry, because it means big savings in steel costs. But thin-wall pipe also needs greater care in construction and handling. . . . p. 110

•

More flexibility in the selection of suitable rock bits is making the drilling contractor's chores a bit easier. A series of improvements in recent months add up to impressive operating gains. . . . p. 35

•

Electronic instrumentation and automation are compounding the electric power supply problems of modern refineries. What can be done about the situation is discussed by a group of experts. . . . p. 95

•

More and better facilities for handling field gas are expected in the months to come. Some of the possibilities were sketched at this week's ASME meeting in New Orleans. . . . p. 42

Up to the Minute / SIGNIFICANT LATE NEWS

AT-A-GLANCE PETROLEUM WEEK Copyright

September 23, 1960

Humble Oil & Refining Co. confirmed this week that it is negotiating to acquire Monterey Oil Co. of Los Angeles. An oil and gas producer, Monterey produces about 15,000 b/d of crude in California, Louisiana, New Mexico, Oklahoma, Texas, and Wyoming. About half of its production is in California. Humble's announcement apparently indicates that the Justice Dept. has given a favorable nod to the oft-reported acquisition plans.

•

Venezuela will limit discounts on future sales of crude to 10% of posted prices. At the same time, however, the Oil Ministry said it will consider bigger discounts if necessary to meet competition in "traditional" markets. A new set of rules to govern future sales includes these specifications: Spot sales must be made at full posted price; and, starting Jan. 1, the maximum discount on contract sales will be 10%.

•

Mexico reportedly will get 23¢ per Mcf. for 150-million cf/d of gas to be sold to Tennessee Gas Transmission Co. for California consumption. Sources close to Petroleos Mexicanos, the government oil agency, say the deal represents about one-third of the gas that TGT contracted last week to deliver to Southern California Edison Co. (page 28).

•

Mid-America Pipe Line Co. wants to transport gas liquids from Canada to the U.S. Upper Midwest, if it can get import-export approvals from U.S. and Canadian governments. Mid-America plans to build a 405-mi., 10-in. line from Superior, Wis., to Chicago in 1961, with an initial capacity of 26,000 b/d. That would be expanded to 55,000 b/d by 1962.

Mid-America would receive gas liquids from Alberta through the Interprovincial Pipe Line System. Deliveries to the latter would be made by two gathering systems, Hydrocarbons Pipeline, Ltd., and Provincial Products Pipelines, Ltd.

•

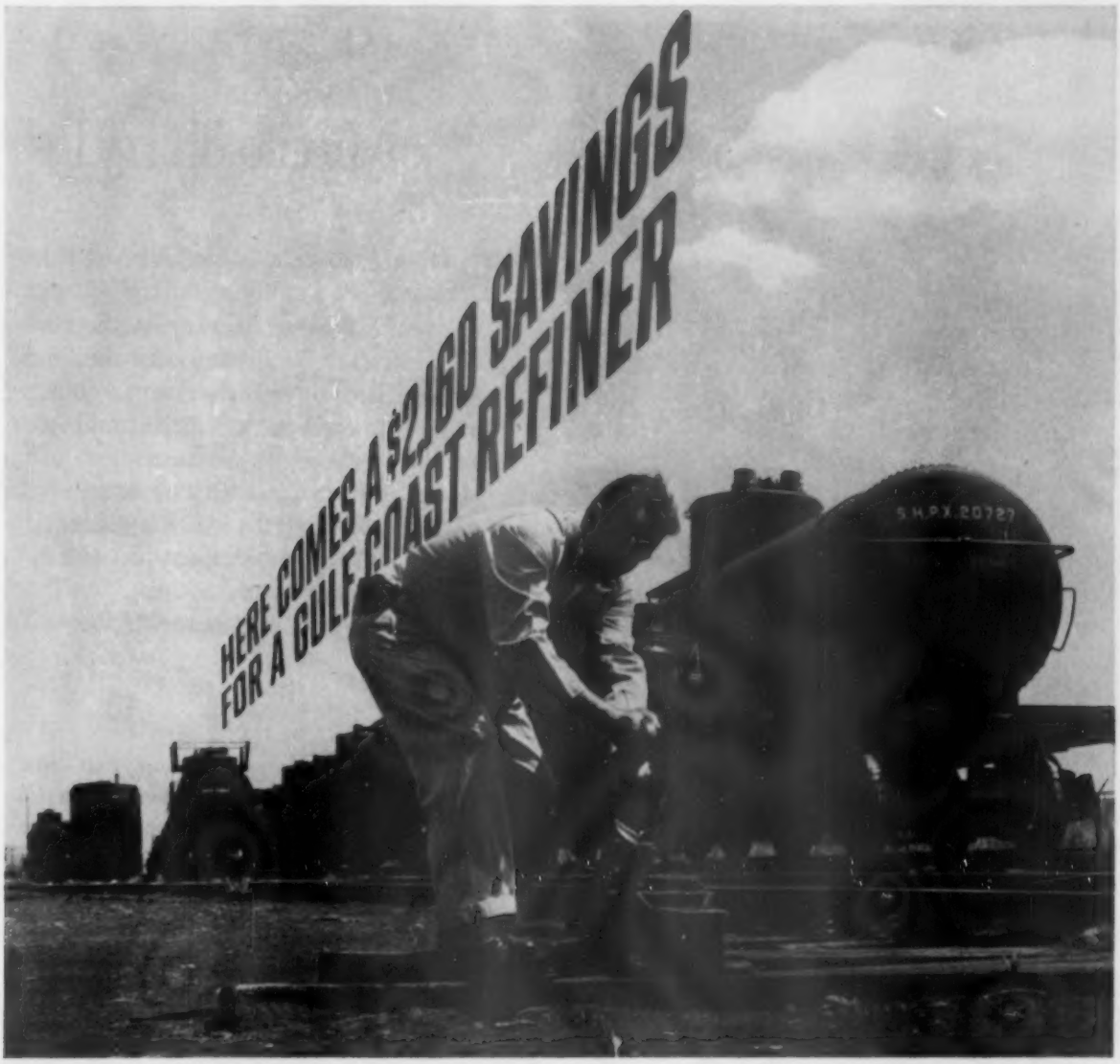
Union Oil Co. of California has rejoined the Western Oil & Gas Assn., from which it withdrew last year. There were no indications, however, that it is resuming its membership in the American Petroleum Institute, which it also resigned last year. A company spokesman says WOGA "isn't perfect," but is making a "sincere effort to put its house in order."

•

The Texas Railroad Commission has set an Oct. 20 deadline for briefs on proposals to transfer crude allowables in the East Texas field. Two proposals by Atlantic Refining Co. and Tidewater Oil Co. were heard this week (page 25).

•

Standard Oil Co. (Ind.) and McGraw-Edison Co. plan joint research and development of fuel cells. The aim is to find an economical method of oxidizing hydrocarbons, alcohol, or hydrogen as fuel.



Investigate how bulk delivery of Tenamene additives can cut your gum inhibitor costs

Eastman's bulk handling system for Tenamene additives saves refiners a substantial amount of money.

In the case of Tenamene 2, the savings on a 36,000 pound tank car amounts to $2,160.

Smaller, but appreciable, savings can be realized through tank truck delivery, with the added advantage of 3-compartment shipment—permitting you to obtain in one delivery up to three Tenamene additives at a bulk shipment price.

Of course, not everyone can benefit from Eastman's bulk handling service. It's practical only for refiners whose inhibitor requirements justify modification or replacement of existing drum handling and storage facilities.

To help you evaluate the economics of a bulk handling system in your refinery operation, we have prepared a comprehensive engineering report that describes the fittings, transfer lines, storage installations and procedures required.

Your Eastman representative will be glad to demonstrate how a switch to bulk purchases of Tenamene additives can cut costs for you. Call him or write to EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

Tenamene

EASTMAN GASOLINE ADDITIVES

SALES OFFICES: **Eastman Chemical Products, Inc.,** Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Detroit; Greensboro, North Carolina; Houston; Kansas City, Missouri; New York City; Philadelphia; St. Louis. **West Coast: Wilson & Geo. Meyer & Company,** San Francisco; Denver; Los Angeles; Phoenix; Salt Lake City; Seattle.

1. Product Service Engineer Jack Wallis is concerned with the safe, efficient handling of "Ethyl" Antiknock Compounds in the field, all the way from unloading to blending. His job includes helping with the design and efficient operation of mixing systems and equipment.

Meet Ethyl's

PRODUCT SERVICE is his job. And that means just what it says.

As a Senior Service Engineer in the Chicago area, Jack Wallis provides the kind of specialized service that saves dollars for his customers in the efficient and safe handling of "Ethyl" products.

He does all this in many ways, some of which are illustrated here. His specialty, however, is in the equipment end of handling and mixing tetraethyllead.

It's taken Jack 21 years of Ethyl experi-

Ethyl Product Service Engineers like Jack Wallis are on the job wherever "Ethyl" antiknock compounds are used; because for Ethyl, *service* is as important as *product*.

2. Suggesting time-saving techniques of product handling, Jack presents a summary of Ethyl improvements in procedures and equipment, designed to streamline handling methods. In the past several years, Ethyl has developed a number of ways to save manpower.

3. In the laboratory with a customer, Jack puts his chemical background to good use in discussing the advantages of Ethyl's newer dyes. Backing up his own experience, Jack has the facilities of Ethyl's specialized dye laboratory to help with dye problems.

Jack Wallis

ence to become as highly qualified as he is today. A graduate with a Bachelor of Science degree in Chemistry and Chemical Engineering from the University of Delaware, he started as a Control Shift Chemist in the manufacturing department.

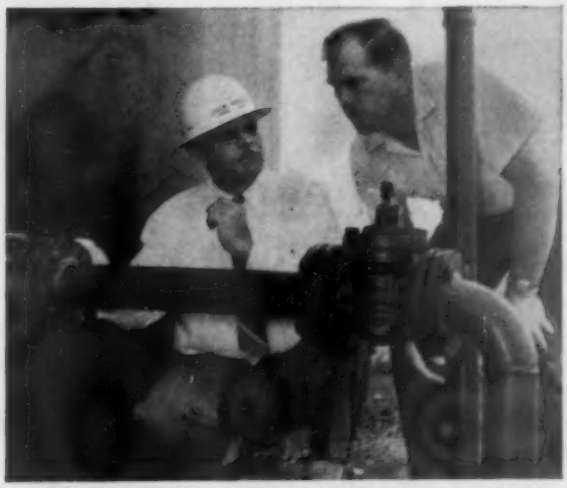
He became an Ethyl Product Service Engineer back in 1950, and since then has applied his skills directly for the benefit of Ethyl customers. Aside from his regular job, Jack is also very active in various phases of API safety work.

ETHYL
ANTIKNOCK COMPOUND
ETHYL CORPORATION

ETHYL CORPORATION

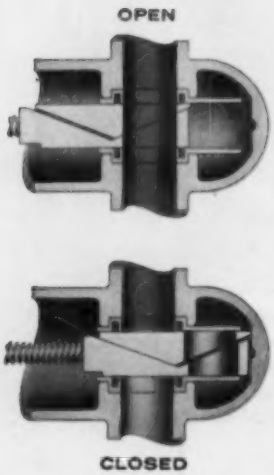
New York 17, N.Y. • Tulsa • Chicago • Los Angeles
ETHYL CORPORATION OF CANADA LIMITED, Toronto
ETHYL USA (EXPORT) New York 17, N. Y.

6. Checking a storage tank at a refinery, Jack gets right inside for a thorough inspection. One of his responsibilities is to help oil companies establish and maintain safe procedures for cleaning tanks which have contained leaded gasolines.



4. Recommending an innovation designed to aid in fast, uniform mixing of antiknock compound with gasoline, Jack helps plan the installation of an Ethyl designed free jet mixing nozzle. This improvement makes use of existing pumps and piping.

5. Presenting a new blending development, Jack is showing photographs of an improved, automatic stop-weight blending system which he personally developed. It adds a predetermined amount of antiknock compound to a blending tank without manual control.



Get the extra margin of control in W-K-M Multiple Completion Valves

Available in no other integral multiples, the famous W-K-M Parallel Expanding Gate lets you control the *seating force* as well as the action of opening and closing.

This extra margin of control lets you close the valve to *absolute shut-off* . . . open it until the gate assembly is sealed positively against the seats for *perfect through-conduit* flow. Result: *no* turbulence to cause erosion or abrasion.

The extra protection of W-K-M Integral Multiples is the most economical production insurance you can buy.

Types: Duals to 10,000 lb.; Duals with Cross to 5000 lb.; Triples to 10,000 lb.; Triples with Cross to 5000 lb.; Quadruples to 5000 lb.

W-K-M

DIVISION OF ACF INDUSTRIES INCORPORATED
P. O. BOX 2117, HOUSTON, TEXAS

6001

Soviet Oil Report is Rosy Red

The people who live in Moscow have been given a rosy—and somewhat distorted—picture of the impressions of the American oil men who visited there last month.

The Moscow News finally got around to telling its subscribers about the U.S. inspection tour last week—a fortnight after the team returned home.

The News is published in several languages, primarily for the benefit of foreigners who live in Moscow.

It wasn't what was said, but how it was phrased and used out of context, and what was left out, that made the Moscow version look better than the actual facts.

Most of the statements in the newspaper article were attributed to William W. Keeler, vice-president of Phillips Petroleum Co. and chairman of the U.S. delegation.

Keeler, advised by PETROLEUM WEEK of the Moscow News article, confirmed most of the quotations, but pointed out, in each instance, how pertinent background had been omitted or abridged.

One comment in the Moscow News report, for example, made it appear that the American oil men had expressed themselves ideologically about "peace . . . and understanding . . . between our countries."

The Moscow newspaper quoted Keeler about the friendliness of the Russian people, and had him saying: "We found many things in common, especially the fact that peace, confidence, and understanding will grow."

But Keeler said this comment grew out of a technical, not an ideological discussion. What he had been referring to were common problems of refiners, such as sulfur and processing techniques, and the thought that an international exchange of data could lead to better understanding. He had no recollection of saying anything about "peace."

The Moscow News also quoted Keeler to the effect that "the people we contacted were highly qualified and confident in their work," and that "over-all, we feel that technical excellence is evident in Russia, particularly in the oil industry."

On these points, Keeler said he had commented that the Russian oil men were capable and competent. But, he added, the writer of the article obviously skipped his discussion of the technological lag that exists.

The newspaper article mentioned that the planned inspection of an offshore installation in the Caspian Sea had been hampered by bad weather, but had the U.S. chairman offering: "When your delegation comes to the U.S. (page 25) our people will show you all of our offshore operations."

Whether this was a misunderstanding or not isn't clear, but Keeler is positive that what he said was that the Soviet group would be given an opportunity to see a "similar" offshore installation, not "all" of them.

The newspaper noted Keeler's observation that the Soviet oil industry uses more manpower than its American counterpart. But it offered its own explanation quickly that this was being done so that more people could be trained in needed skills.

Another quotation attributed to an unidentified member of the U.S. delegation seemingly was a tribute to the Russian way of doing things.

This quotation, which omitted the background references, had the American oil man saying: "You are more fortunate than we are.

"You can develop your fields where and how you want to. You can do that much more efficiently than we because efficient development of the oil fields in our country is handicapped by ownership by different companies."

What they actually were talking about, Keeler said, were waterfloods and the problems of unit agreements.

But, Keeler said, there was no intent to infer that efficient development of all American fields is handicapped by private ownership.

Socal Readies Consolidation Plan

Standard Oil Co. of California is consolidating its operations east of the Rockies, but its terse disclosure, which contained few details, posed almost as many questions as it answered.

Company spokesmen frankly admit that the statement was premature—that many of the details of the consolidation are yet to be worked out, and probably won't be finalized much before the end of the year.

Circumstances, however, dictated the need for a comment at this time, these sources said. Actually, the company's new plan was not announced publicly, but was read on the phone to interested callers.

Some sources interpreted the consolidation—which goes into effect

Jan. 1—as presaging a major push for new markets, while others termed it a move to give the company flexibility.

The phone statement contained this significant line:

"This [the consolidation] establishes a corporate identity that can be used throughout the U.S., where the company cannot use the 'Standard' name."

The company source said this undoubtedly means market expansion; another said it merely gives the company an opportunity to throw off restrictive yokes of subsidiary operations and territorial limitations.

A new company, to be known as California Oil Co., will come into being in January, and will be a superstructure over at least four, and possibly five, subsidiaries in the U.S. excluding the Far West.

Officers and directors of the new California Oil Co.—not to be confused with the one bearing that name now—will be identical with the executive heirarchy of the parent firm.

Companies affected by the reorganization will become divisions of the new California Oil Co., and their present managements will continue on a divisional basis rather than a subsidiary status.

Companies to be consolidated—and there's still some confusion on the mechanism for this, too—are:

- The California Oil Co., which refines and markets in 12 eastern seaboard states from Maine to Virginia;
- The California Co., which has exploration and production in Rocky Mountain, central, eastern, and southeastern states, and markets in seven north central states.
- Standard Oil Co. of Texas, with exploration, production, refining, and marketing operations in Texas and New Mexico;
- Salt Lake Refining Co., which refines in Utah.

Still up in the air is the status of Pasotex Petroleum Co., of Oklahoma, whose exploration, production, and marketing activities are limited.

Standard Oil Co. of California, Western Operations, Inc., will continue to operate as a separate entity in the western states, Alaska, and Hawaii. Socal's pipeline and tanker companies, its research operations, and other units will not be affected by the reorganization.

Three regional divisions, including a new one in Denver, are in the works too, but here again the details are sketchy, at best.

Eastern headquarters for marketing and refining will be located in Perth Amboy, N.J., and its president is to be E. E. Wall, who is president of the present California Oil Co.

Western headquarters for marketing and refining will be in Denver, and F. C. Loomis, a vice-president of Western Operations, Inc., is scheduled to head up this office as president.

The Mississippi River is to be the dividing line between the two areas.

A headquarters for exploration and production is yet to be selected but it will probably be in New Orleans.

Crude Stocks at 13-Year Low; Will Stay Tight Through 1960

The refiners' latest processing spree has bled crude inventories to a 13-year low. And the promise is that crude will be tight at least through December.

Processors have set a dubious record by keeping runs to stills well above 8-million b/d for 13 straight weeks in the face of a products glut. Consequently, crude stocks of domestic and foreign origin had plummeted to 227.8-million bbl. by mid-September. This is just 2,858,000 bbl. shy of the previous low record set in December, 1947.

In Texas and Oklahoma, stocks are at the lowest ebb since the height of crude-hungry World War II, down to 96.9-million bbl. and 14.8-million bbl., respectively.

How far stocks must fall before a crude drought hits refineries still remains a question mark.

Stocks east of California—the major factor in determining how high runs can go—are down to their lowest level since September, 1948. They stand at 201.7-million bbl.—almost 20-million bbl. under what was popularly believed to be the "cutback point."

Crude stocks are up just 4.7% over this 12-year period, yet crude throughput is almost 54% higher.

Paradoxically, a statistical boost in throughput has followed close to the heels of each recently announced "cutback" in runs to stills.

But with producers playing doctor to processors' excesses, the break in runs could come soon. Texas is on an eight-day producing schedule for the sixth straight month.

After finding inventories of major products 57.4-million bbl. higher than what companies have reported as "desirable," the Texas Railroad Commission turned down strong pleas by six major companies to increase output in the state in October.

Chairman Ernest O. Thompson, commenting on figures showing a shortage of crude, remarked, "Apparently they've converted crude into products."

The commission consequently set the average October allowable at 2,630,576 b/d, down 47,644 b/d from September. (The decline is due to the difference in calendar days between September and October.)

Stocks by State of Origin

(thousands of barrels)

	Dec. 1947	Mid-Sept. 1960	Difference
Pennsylvania Grade	1,278	2,312	+ 1,034
Other Appalachian	1,638	1,473	— 165
Lima-Michigan	1,575	1,135	— 440
Ill.-Ind.	9,617	7,894	— 1,723
Arkansas	3,250	1,900	— 1,350
Kansas	8,364	8,658	+ 294
Neb.-N. D.	—	2,813	—
Louisiana	11,446	18,056	+ 6,610
Miss., Ala., Fla., Ga.	2,604	1,896	— 708
New Mexico	6,317	7,927	+ 1,610
Oklahoma	26,584	14,793	—11,791
Texas	114,130	96,918	—17,212
Wyoming	7,456	14,403	+ 6,947
Other Rocky Mt.	2,303	9,345	+ 7,042
California	24,382	26,095	+ 1,713
Foreign	3,985	12,169	+ 8,184
Total U.S.	224,929	227,787	+ 2,858

Stocks of both gasoline and distillates are some 25-million bbl. higher than "desirable," the Texas Railroad Commission figures.

Humble says its gasoline stocks are "just comfortable." It adds that refinery turnarounds in October will reduce them to desired levels by Nov. 1.

The company reports its gasoline stocks on Sept. 1 at 17.6-million bbl., down 600,000 bbl. during August.

Similarly, Indiana Oil Purchasing Co.'s president, R. F. Pielsticker, reported its gasoline stocks "ample," and stocks over-all at about desired levels.

New Mexico's allowable will hold steady in October, too.

The state's oil conservation commission has set crude allowables at 33 b/d for southeastern pools and 70 b/d for the San Juan basin, unchanged from September.

Soviets Will Push to Meet Oil Goals

The Russian oil industry is inefficient by U.S. standards, but complete control by the state insures it will be successful in meeting its goals, George T. Piercy, Jersey Standard's chief petroleum economist said in San Antonio this week.

Piercy, a member of the U.S. team that visited the Soviet Union last month, declared: "One leaves Russia with a definite impression that their system works only because of the complete control of all that is written and spoken; in fact, the complete control of thought itself."

He told the annual meeting of the Texas Mid-Continent Oil & Gas Assn. that Russian oil expenditures during the seven-year plan ending in 1965 are 2½ times the previous seven-year outlays, to double drilling footage, oil production and to hike gas output five-fold.

He noted that in the past 14 years (1946-59), the Russians drilled only 210-million ft. (equal to that drilled in the U.S. in 1959 alone), but increased its oil production by half as much as the U.S. did in the same period. U.S.S.R. gas production in those years only rose 1/20th as much as in the U.S., he noted.

Piercy, agreeing with other members of the U.S. team, said Russia "probably will find enough oil to meet its production targets" but maybe with some other problems.

The seven-year plan, he explained, calls for practically doubling the efficiency of Russia's drilling rigs, "bringing them up to almost U.S. proficiency."

But the Russians, he observed, "have a high safety factor in the projected number of drilling rigs, so even if they do not reach the efficiency goal, they will succeed in meeting the drilling target."

Pipeline construction could be another bottleneck, he said, "but they are aware of this and we can expect a crash program to insure completion by the target date."

Russian drilling techniques are an "enigma," Piercy said.

He explained: "Drilling rigs show a shortage of steel. Wooden walkways are used, and they have wooden or earthen mud pits. However, they also leave a derrick over all wells."

Russian refineries, while so spaciously laid out as to be uneconomical, have safety standards far below the U.S. and are poorly maintained.

While Russian refineries are "grossly overmanned" by U.S. standards, the operators are not much concerned about quality. "It appears that if the material will explode or burn, it is satisfactory. Customer acceptance is no problem—the customer has no choice."

The Russians claimed to have a workable platinum reformer. However, "private discussions revealed they are having trouble with this process," Piercy noted. "They have no hydrogen treating facilities."

Estill S. Heyser, who was re-elected president of Texas Mid-Continent Oil & Gas Assn. this week, said he finds "little to cheer about" in the Texas oil situation.

He noted that crude prices may not be "as jittery" as they were a few months ago, but he expressed concern over present surplus inventories of finished products.

U.S. May Cancel Soviet Visit

The State Dept. is "seriously considering" possible cancellation of Russia's inspection of U.S. oil operations, as a result of "spy" charges hurled against two Interior Dept. officials.

U.S. officials were upset by the charges made against government representatives who accompanied the U.S. team last month.

What action will be taken, however, depends on a detailed study of the charges.

The Soviet newspaper, Izvestia, alleged that the Interior Dept. men tried "by all means" to obtain restricted information, and also took notes on Soviet radar installations.

The Interior representatives were Alex Gakner and Robert Ebel. Izvestia charged bluntly that Gakner was "a spy sent by the U.S. to the U.S.S.R. to collect information on oil producing regions.

While the State Dept. weighed the spy charges, it also made tentative plans for the inspection tour by Soviet oil experts next month.

The Russian group, at the moment, is to arrive in New York on Oct. 10 and, after a briefing at American Petroleum Institute headquarters, is to visit these places:

Oct. 12-14: Esso Research, Linden, N.J.; Mobil refinery, Paulsboro, N.J.; Tidewater refinery, Delaware City, Del.

Oct. 15-17: Washington, discussions with government officials.

Oct. 18-22: Continental offshore area near Morgan City, La.; Cities Service refinery, Lake Charles, La.

Oct. 24-27: Rice Institute, Houston; Texas Railroad Commission, Austin; Spraberry Trend.

Oct. 28-Nov. 1: San Francisco; California Standard's Richmond refinery; Elk Hills field.

Nov. 2-5: Tulsa; the Bureau of Mines station, Bartlesville; the East Texas field, Kilgore.

Nov. 6-7: Western Pennsylvania oil fields.

Nov. 9-12: New York, for further consultation with API officials.

East Texans Protest Changing Field Rules

Rules changes in the East Texas field that may be necessary for more efficient production of oil are not necessarily beneficial to the economy of East Texas, the Railroad Commission was told this week.

The comments by numerous East Texas civic groups were made this week at a hearing on two proposals for transferring allowables from some prorated wells to others.

The two proposals that started the controversy would not result in changing total production from any lease, nor total output from the field. The plans offered would, however, reduce the number of producing wells. Estimates of the number of wells to be affected by the plans range as high as 10,000.

The strong opposition stems from anticipated loss of jobs, particularly from well-servicing operations.

The arguments started over two separate proposals by Atlantic Refining Co. and Tidewater Oil Co. to permit transfers of allowables from one prorated well to another at the option of the operators.

Atlantic requested that allowable transfers be allowed for wells less than 950 ft. apart. A maximum of seven wells would be shut in to produce from an eighth.

Tidewater proposed that operators

be permitted to form production units with a maximum of 44 acres each, permitting one well to produce for two others that would be shut in. Production from such units would be limited to 600 bbl. per month.

The wells shut in would not be abandoned, but could be reopened for production at any time.

The purpose of the proposals would be to extend to prorated wells the higher production now permitted nonprorated wells in the East Texas field.

There are about 19,260 wells in the field, of which about 16,000 are subject to shutdown days.

The 3,000 marginal wells in the field are not subject to shutdown days and are permitted to produce up to 20 bbl. per day each every day, or 600 bbl. in a 30-day month.

Top prorated wells get about a 20 b/d allowable. But on the eight-day producing schedules that have been in effect since last May, such wells are limited to 160 bbl. in a 30-day month, or just over 5 b/d.

PETROLEUM COMMENTS / By Wanda M. Jablonski

Implications of the Baghdad Oil Meeting

Last week's Baghdad conference of the five main oil exporting countries was significant not only for what it did, but also for what it did not do.

On its positive side, of course, there's no doubt that the conference itself was history-making. It marked the first time that exporting countries of such diverse interests and backgrounds as Iran, Venezuela, and the Arab states of Saudi Arabia, Iraq, and Kuwait actually sat down jointly to discuss a common issue.

The main tangible result of the meeting was the decision to hold more such conferences in the future. To this end, the formation of an "Organization of Petroleum Exporting Countries" was announced, for regular consultation among its members "with the object of coordinating policies and attitudes in eventualities concerning oil production."

* * * *

On the other hand, there was no indication that the group was won over to the world oil proration scheme being pushed by two of the delegates: Saudi Arabia's Oil Director Abdullah Tariki and Venezuela's Oil Minister Juan Perez Alfonzo.

When the conference first opened, there was some talk among the delegates about including on the agenda a discussion of "production quotas," and also revision of 50-50 profit sharing.

More moderate elements apparently prevailed, however, for the final agenda was confined to the question of prices (for which the conference originally had been called).

* * * *

Noteworthy, too, was the contrast between the militant note on which the conference opened and the comparative mildness of the "decisions" subsequently announced.

The opening tone of the meeting had been set by Tariki, who announced on his arrival at Baghdad that the five oil exporting countries represented there "have only to unite to impose their will." Tariki had also announced that the Middle East governments would "refuse to accept" the recent price cuts.

By contrast, the final "decisions" on prices announced by the delegates made only these points:

- That oil companies should not change prices without prior consultation with the governments.
- That everything possible should be done to raise prices to the level prevailing before the recent cuts were made.
- That oil is important to the economic development of producing and consuming countries: that the countries, thus, could not stand by if the companies attempted future changes in crude prices but would demand that companies maintain stable prices.
- That the new organization of exporting countries should find some formula at a later date for stabilizing prices in a manner to guarantee a regular, stable income to producing countries, while also giving assurances and guarantees for foreign oil capital investment.

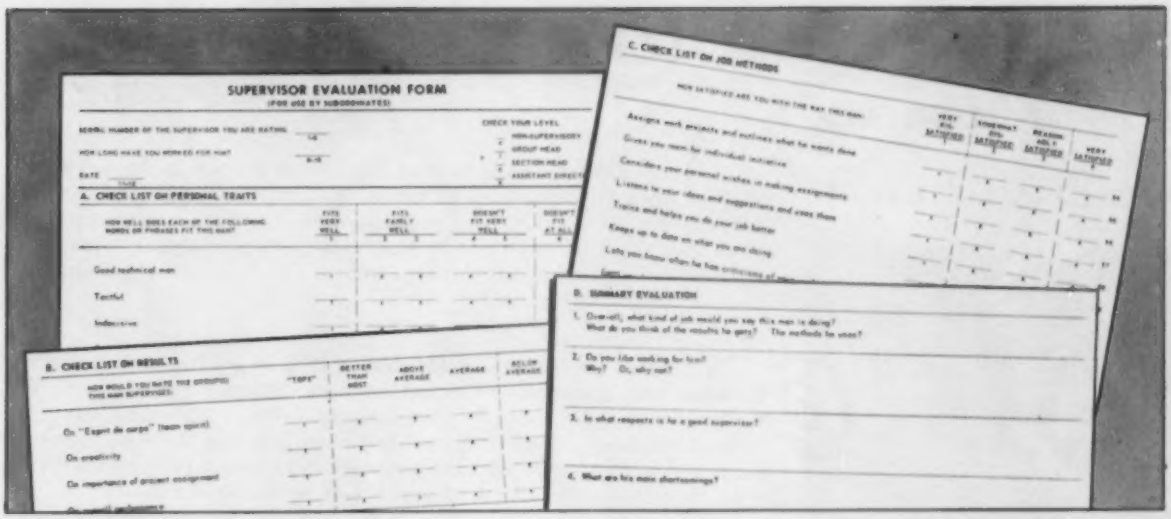
* * * *

In effect, what the Baghdad conference did was to reiterate the one thing all the producing governments already agreed on: their anger at price cuts, particularly when made without prior consultation. Everything else in the way of price stabilization schemes was put off for future "study."

Already the new permanent organization of exporting countries has been hailed in some Middle East quarters as the framework for an international oil exporting countries' cartel. This is a potentiality, of course, that neither the oil consuming countries nor the oil industry can altogether ignore.

On the other hand, there appears to be sufficiently wide diversity of interests among the governments represented at the meeting to largely outweigh the surface mutuality of interests. One has only to note that, even while the Baghdad conference was in progress, one of the participating governments told the oil companies that it acknowledged the commercial necessity of price cuts under certain market conditions, but that it insisted on a "bigger share" of the production increase than it has been receiving.

In short, no joint policies have emerged as yet from Baghdad; only a warning that these governments may, in fact, actually band together in the future if the oil companies ever anger them sufficiently again.


SUPERVISOR EVALUATION FORM
A. CHECK LIST ON PERSONAL TRAITS
B. CHECK LIST ON RESULTS
C. CHECK LIST ON JOB METHODS
D. SUMMARY EVALUATION

Rx to Help Bosses: Employee Ratings

Esso Research & Engineering Co. reports its "Rate Your Supervisor" program is making a substantial contribution toward helping its lower echelon managers become better bosses. And, the company adds, the staff's approval of the program is heartening.

The program has been conducted in nine principal technical divisions and two staff divisions. With some computer help, 275 reports were prepared for supervisors in the first three division levels of management.

The details and results of this program were outlined this week by the company's P. W. Maloney and P. J. Patinka at the American Society of Mechanical Engineer's petroleum conference in New Orleans.

They commented: "It was even more heartening to note that the reports apparently generated some behavioral changes in the supervisors who were rated. Of course, since each supervisor acted on his own unless he chose to consult his bosses, it can only be hoped that the changes he made were for the better. At any rate, the time and effort that went into the program seemed justified."

Basically, the program is a self-development tool that permits the supervisor to see, through the eyes of his subordinates, where he can improve and where he is performing well.

The raters of the supervisors—mostly professional technical men—were given four categories of appraisal: personal traits, results, job methods, and a summary evaluation.

The appraisal method used was a multiple-choice, check-list form, covering 67 descriptive phrases of a supervisor. The individual supervisor was the only person in the firm who knew how he was rated. And raters were assured their anonymity.

The final report sent to a supervisor showed the percentage of raters who gave each of the possible answers. As benchmarks, the supervisor was also given two additional percentage breakdowns: (1) the ratings given all supervisors at his level in the technical division; and (2) the distribution of ratings on all supervisors at his level for all technical divisions.

The ratings indicated that while supervisors had no lack of technical competence, they could improve in certain leadership and communications skills.

This was particularly true with regard to job performance appraisal and personnel development.

Using 1,205 ratings on first and second level supervisors, the 67 items were ranked in the order with which the supervisors got a favorable response. This showed that while the supervisor's fairness and technical ability were generally praised, there was a cooler feeling toward his leadership abilities.

This was all a part of the company's research on the ratings. It was felt that the rating forms might yield some generalized data that could be helpful to management thinking on supervisory development. However, since the plan evolved as a self-development tool, little attention had been given to research possibilities.

"No great weight can be placed on the research findings," the two men said. "But it is reasonable to conclude that (1) an over-all analysis of Rate Your Supervisor data can identify units in greater need of managerial attention, and (2) those supervisory functions which are most and least in need of attention can be similarly identified."

The supervisors themselves report that the program's results have generated some changes in behavior on their part.

In an Opinion Survey of the program, 81% of those supervisors rated said they decided to change some methods disapproved by subordinates. And 82% said they made a conscious effort to continue operating in some manner endorsed by their subordinates.

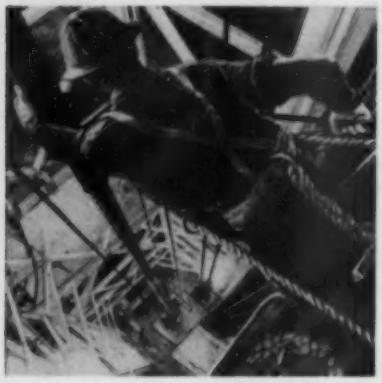
In addition, 24% of the subordinates said they had seen lasting changes in their supervisors.

Twenty-two percent of the supervisors said they were surprised at the unfavorable ratings and/or comments they received.

But only 7% were surprised by the favorable comments. Most of the supervisors thought the ratings were valid, and that the raters had drawn an honest picture as they say it.

Seventy-one percent thought the program was worth the $25 to $30 each report costs. However, three-quarters of the supervisors said they would like to see the program repeated within a year or so. And over half of both supervisors and subordinates thought the program had affected company productivity favorably.

THE BEST SAFEGUARD IS KNOWLEDGE



In the oil and gas industry, knowledge is acquired only through long years of experience. Republic, as a pioneer oil bank in the South . . . with the South's largest Oil and Gas Department, has this knowledge. For decades, Republic has been pacing the industry, keeping thoroughly informed on new trends and developments, credit ratings, equipment distributors and all the varied factors involved in oil and gas financing.

Republic offers you not only unlimited resources but also the strength which comes from specialized knowledge. Next time you need bank service on an oil or gas matter, talk to Republic, indisputably a leader in the field. We understand your problems . . . speak your language and have the resources to best protect your interests.

REPUBLIC NATIONAL BANK OF DALLAS

CAPITAL AND SURPLUS
$102,000,000
LARGEST IN THE SOUTH

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

What's New / IN THE INDUSTRY

A detailed questionnaire on East Coast resid prices is in the mill at the Office of Civil & Defense Mobilization. It's aimed at finding any spread between posted and actual resid prices, and will be sent to distributors and major customers in about two weeks. Before it's sent out, the proposed questionnaire will be reviewed at a meeting of the Budget Bureau's industry advisory council on Sept. 26.

•

A contract for delivery of 455-million cf/d of gas has been signed by Tennessee Gas Transmission Co. and Southern California Edison Co. W. W. Witmer, TGT's senior vice-president, hails the action as the second important forward step in a $225-million pipeline project involving the two companies and Petroleos Mexicanos, Mexican government oil agency (PW—Aug.12'60, p14). Delivery will be over a 20-year period beginning in 1962.

Bulk of the gas will originate in South Texas fields and will be transported through a pipeline running south to Reynosa, where it will connect with the Pemex line for delivery to Mexicali, on the California border.

•

The National Labor Relations Board has called for a collective bargaining election at Mobil Oil Co.'s Buffalo refinery. The 250 employees there are currently represented by the Petroleum Union of Buffalo Refinery Employees, an independent organization. It has been challenged by the Oil, Chemical & Atomic Workers Union (AFL-CIO). The election will be held within the month.

Elsewhere on the labor front, negotiations start this weekend between Sinclair Oil Corp. and OCAW. The union's nationwide council of Sinclair employees will meet company representatives in Kansas City to start discussions on the union's demand for an 18¢-an-hour pay boost.

•

Delhi-Taylor Oil Corp., Dallas, has bought a 40% interest in Three States Natural Gas Co. in the first step toward full control. Delhi purchased 700,000 shares each from John A. McGuire, Three States' chairman, and W. H. Hudson, president, and 1-million shares from Jack Frost, a Three States director and one of the company's founders.

•

Some 450 strikers are returning to work after a prolonged walkout at Jefferson Chemical Co.'s Port Neches (Tex.) plant. Members of OCAW Local 4-228 gave the nod to a new contract that calls for a 10¢-an-hour boost for senior laboratory workers, liberalization of funeral leave, and policies dealing with industrial injuries.

•

The oft-discussed merger of the National Petroleum Assn. and the Western Petroleum Refiners Assn. is still being mulled over. The possibility of uniting the two organizations was discussed by NPA's board of trustees last week at the association's annual meeting at Atlantic City, N. J. Nothing was presented to the board for action, however.

•

Edward Martin, Jr., Washington, Pa., is the new chairman of the National Liaison Committee of Cooperating Assns. A past president of Southwest Pennsylvania Oil Producers' Assn., Martin succeeds A. E. Hermann, Amarillo.

"...pacing the pipeline construction industry
for more than a quarter century"

price tower

PIPELINE
H·C·PRICE·CO
CONSTRUCTORS

bartlesville, oklahoma
cable address: HCPCO

Looking Ahead in Washington

McGraw-Hill
Washington
Bureau
September 23, 1960

Oil and gas depletion gains momentum as a presidential campaign issue. In the Southwest producing states, the depletion provision could well prove the "swing" issue in the November election. Democratic leaders are scrambling to convince oil men and oil workers that the party platform does not necessarily mean a cut in the depletion percentage. And in Washington, most political observers don't believe Sen. John F. Kennedy, the Democratic nominee, will become a personal antidepletion crusader if he wins in November. There are other goals more important to Kennedy—health insurance, minimum wage, and others.

House Speaker Sam Rayburn (D., Tex.) lays it on the line: The Democrats are responsible, he says, for maintaining the depletion rate. Rayburn says the House Ways & Means Committee would vote to reduce depletion if men such as he and Rep. Frank Ikard (D., Tex.) did not make known their objections. It has been generally known in Washington that, without the Rayburn influence, Congress might yield to demands for a depletion cut. But now the Speaker is publicly proclaiming his role. His action signifies the growing role of depletion as a factor in the fall voting in the oil country.

•

The Federal Power Commission may take a strong stand on customer responsibility of natural gas pipelines. The idea that an interstate pipeline's first responsibility is to its firm utility customers has been strongly stated in a ruling by FPC Examiner Francis L. Hall. After more argument, the commission will have to decide whether it will go along with the examiner's bare-knuckled conclusions. Hall, in an opinion subject to commission review, told Mississippi River Fuel Corp. to give its utility customers first call on virtually all its pipeline capacity. This means the pipeline must stop service to industrial customers if the gas is needed by firm utility customers.

Most pipeline companies already accept this principle—utility customers first, industrial sales next. But Hall's ruling came in a particularly forceful statement, and industry observers are waiting to see whether FPC itself takes such a strong approach.

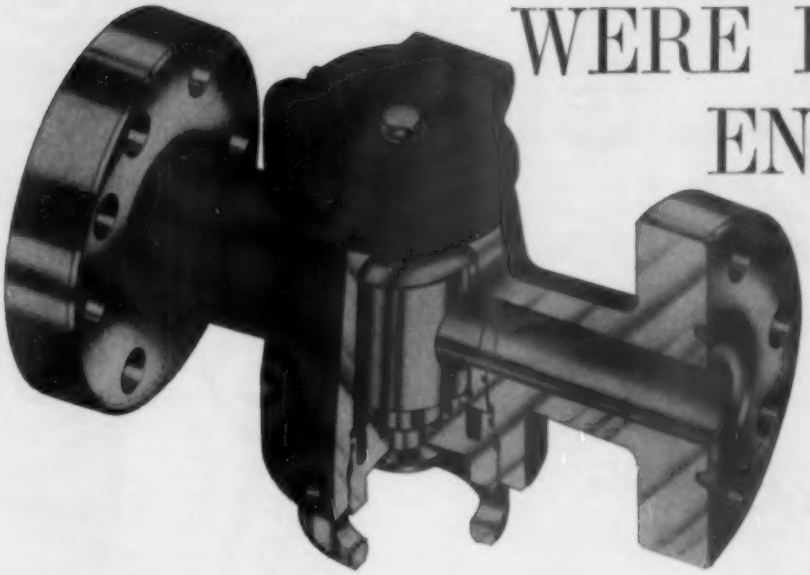
Even if the commission adopts Hall's language, the action won't signal any change for most gas pipeline operations, however. Hall said Mississippi River Fuel's biggest utility customers were right in refusing to accept the pipeline's offer to form a new subsidiary to meet their increasing needs.

The utilities insisted on having the benefits of reduction of costs by off-peak industrial sales on Mississippi River Fuel's main system. The company also was ordered to lower its penalties in rates to utilities which have overrun their stated demands. Hall noted that the cost to Laclede Gas Co., the pipeline's biggest utility customer, for overrunning its contract demand by 5% is about $157,000 a day. The examiner said such a provision is "inequitable and discriminatory."

•

The National Assn. of Manufacturers—a powerful lobby in Washington—is caught in an oil-vs.-coal crossfire on fuels policy. NAM probably will try to straddle the fence and take no definite position on a broadly-worded coal resolution following some fireworks at an association meeting last week.

WHEN NO OTHERS WERE RUGGED ENOUGH...



we designed our own!

LO-TORQ PLUG VALVE

SIZE AND SERVICE RANGE

Valve Size	End Connection	Working Press. (psi)	Test Press. (psi)
1"	2" Threaded (male)	15,000	20,000
1½"	Threaded (female)	15,000	20,000
2"	Threaded (female)	10,000	15,000
2"	Threaded EUE Tubing (female)	5,000	10,000
2"	Series 900 A.P.I. Ring Joint Flange	3,000	6,000
2"	Series 1500 A.P.I. Ring Joint Flange	5,000	10,000
3"	Threaded (female)	3,000	6,000
3"	Threaded (female)	5,000	10,000
3"	Series 900 A.P.I. Ring Joint Flange	3,000	6,000
3"	Series 1500 A.P.I. Ring Joint Flange	5,000	10,000

In addition to these models, the Lo-Torq Plug Valve design is available in several valved Christmas Tree applications.

The high pressures and abrasive fluids we work with daily in our fracturing, cementing and chemical services call for only the toughest kind of plug valve. We searched everywhere and when none stood the test nor met our exacting specifications, we designed and manufactured our own. Today, our Lo-Torq Plug Valve is the toughest, most dependable of its kind . . . so well-accepted that we have had to increase the size and service ranges to meet your increasing demand. Now, the Lo-Torq Plug Valve is also available with flanged ends, as illustrated above . . . in 2" and 3" full-opening sizes . . . plus the regular line of 1" to 3" valves with threaded connections. *Working pressures* range from 3,000 psi to 15,000 psi; test pressures from 6,000 psi to 20,000 psi.

CHECK THESE ADVANCED FEATURES:

Economical Low initial cost . . . very little maintenance.

Easy to use Balanced cylindrical plug requires less effort to operate. One quarter turn from full open position completely closes valve.

Easy to maintain Does not require removal from the line for repair or replacement of internal parts . . . no matching parts requiring return to factory.

Rugged For heavy duty operation . . . and is light in weight for mobile field application.

FOR MORE INFORMATION . . . SEE YOUR NEARBY HALLIBURTON MAN

275 Service Centers . . .
just minutes away from your well

Halliburton
COMPANY • DUNCAN, OKLAHOMA

INTRODUCING . . . SUE*

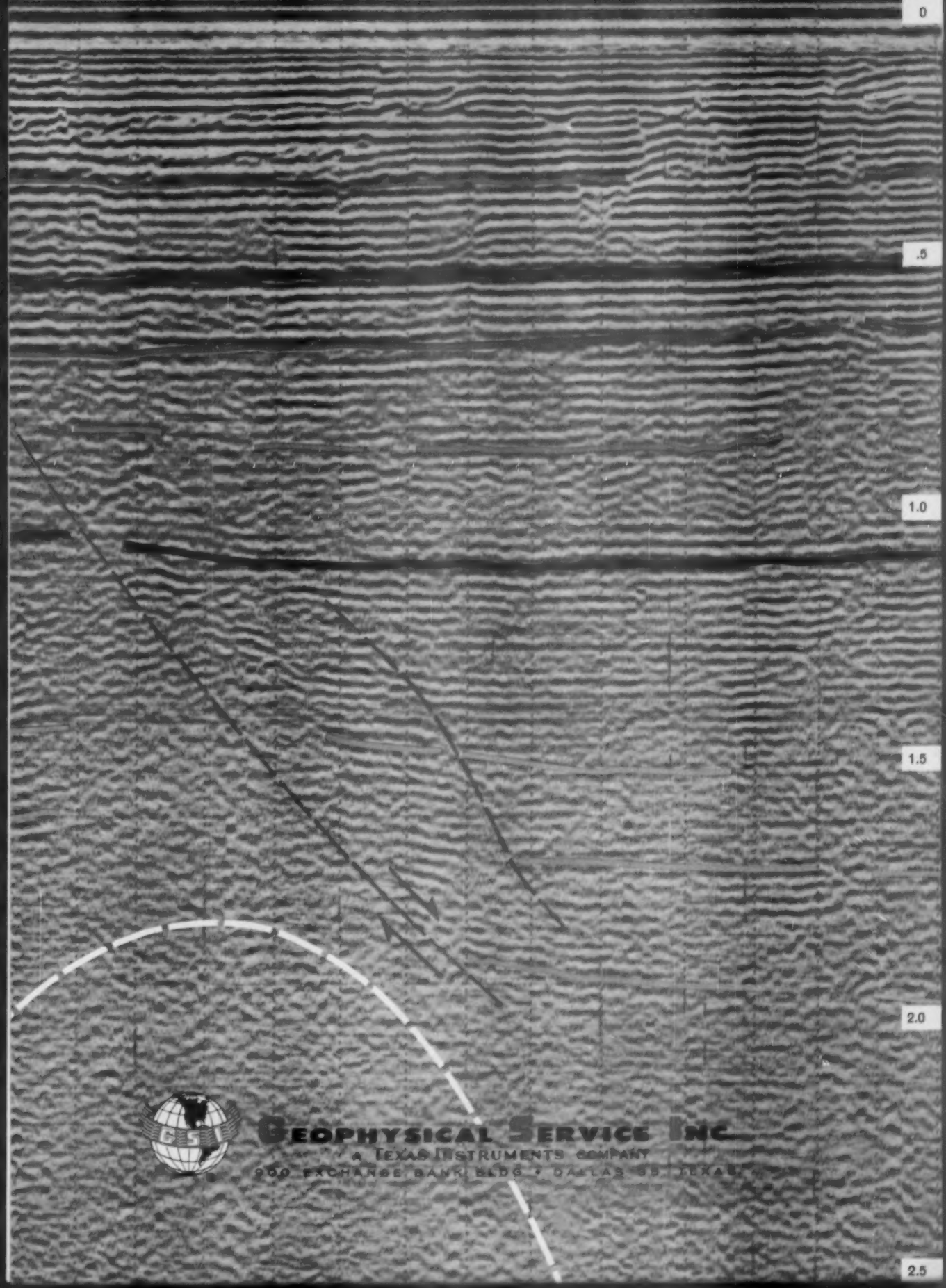
Geologic structures at depth can be accurately *and inexpensively* mapped with SUE, GSI's new Seismic Underwater Explorer.

This depth of penetration and the portability of the system make it ideal for inland water, coastal and offshore exploration.

Make a date to talk with GSI about SUE.. she's the sweetest marine seismic system you've ever met!

Distance of Traverse = 5.3 Miles

*SUE IS A GSI SERVICE MARK


0
.5
1.0
1.5
2.0
2.5
GEOPHYSICAL SERVICE INC
A TEXAS INSTRUMENTS COMPANY
900 EXCHANGE BANK BLDG. / DALLAS 35, TEXAS

THREDKOTE 701

is the tool joint Thread Compound that contains **60% zinc**

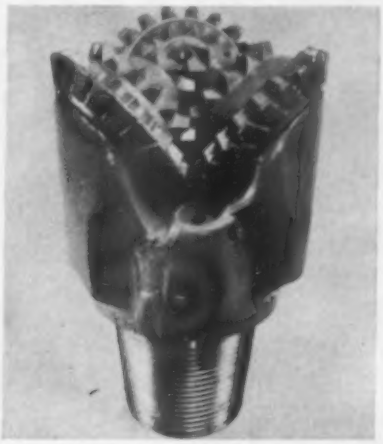
Humble THREDKOTE 701 gives you the lubrication and protection you need and want. The zinc effectively guards against metal-to-metal contact and prevents galling as the string is run. THREDKOTE 701 maintains its quality and assures protection under the most rugged running conditions.

Delivery is quick. Order THREDKOTE 701 from your nearest Humble bulk plant in Texas, New Mexico and Arizona. Other areas contact Humble Oil & Refining Company, Houston, Texas.

HUMBLE

HUMBLE OIL & REFINING COMPANY

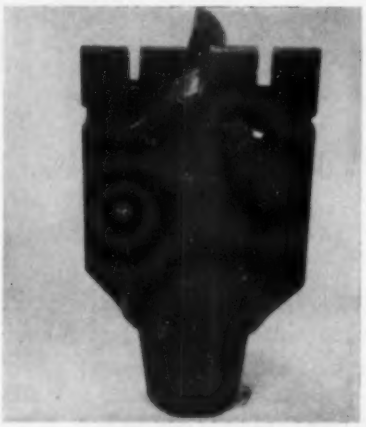
REED ROLLER BIT Co.'s YHW-G has sintered tungsten-carbide inserts.



SECURITY ENGINEERING's H7T-W has T-teeth on two of three cones.

HUGHES TOOL Co.'s RG1-J "Tri-Cone" is for very hard, abrasive rocks.

Rock Bits Are Better Than Ever



PHIPPS DRILL BIT Co. bit has four jets and tungsten-carbide blades.

Manufacturers have come up with a sweeping array of newly designed rock bits with vastly improved characteristics.

These bits are better metallurgically —upgraded in cutting and gauge qualities—yield better penetration, and last longer.

Many of them are designed specifically for special situations. But taken collectively, they provide a much wider choice for the drilling contractor than he had even a few months ago.

The introduction of the sealed-bearing bit is one of the major developments of recent months. It has since been followed by others.

The Hughes Tool Co. self-lubricating bit went into production late last spring (PW—May13'60,p28), and two sizes, 7⅞ in. and 8¾ in., are now being turned out.

The line eventually will include all "R" series and cutting sizes between 7⅞ in. and 12¼ in.

The company also is proceeding with development of the sealed-bearing principle in the small "R" sizes.

Hughes has come out, too, with several additional improvements.

- The 12¼ in. OWV is designed to give better performance in sandy shales and shales alternating with streaks of sand, anhydrite, gypsum, and limestone.
- The OSC-3A made for softer formations.
- An improved W7 and the

CHICAGO PNEUMATIC's "Slant Jet" has slanting nozzles to clear cuttings.

VAREL MANUFACTURING Co.'s VH1-M is for hard, abrasive formations.

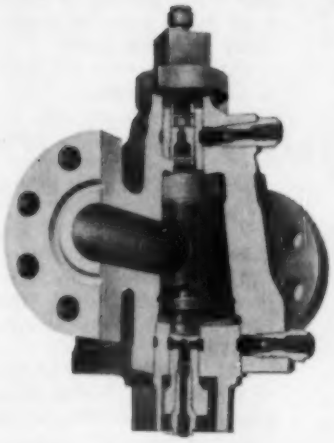
HUNT TOOL Co.'s combination bit has cutter cones and drag type blades.

the idea:

Lubrication Makes Things Work Easier, Last Longer

The first recorded use of specially compounded lubricants (a cooked mixture of animal fats and calcium soap) was on chariot wheels in 1400 BC. Today, 34 centuries later, it is still common sense that *any* lubricated mechanism will work easier, last longer and cost less to use than a non-lubricated one.

the application:



How It Helps Give You A Better Valve

In the Rockwell-Nordstrom *lubricated* plug valve, metal-to-metal wear is practically eliminated by lubricant. And, the hydraulically compressed lubricant forms a powerful barrier against leakage around the plug. By jacking against the small end of the tapered plug to keep it free, lubricant also assures instant ¼-turn operation.

the benefits:

Longer Valve Life At Lower Cost . . . Leak Proof Sealing . . . Instant 1/4-Turn Operation . . . No Exposed Seating

The 6 million Rockwell-Nordstrom lubricated plug valves now used in a wide variety of industries are translating these benefits into dollars and cents savings day after day. Rockwell-Nordstrom is the most complete line of lubricated plug valves (sizes from ½" to 36"; pressures to 15,000 lb), lubricants and operating accessories. For *practical* help in solving your flow control problems, see your supplier or write: Rockwell Manufacturing Company, Dept. 96-J, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited. If you live outside the U. S. or Canada, write: Rockwell International, S. A., Geneva, Switzerland.

Lubrication Makes The Difference

ROCKWELL-Nordstrom VALVES

another fine product by

ROCKWELL

High pressure Christmas tree equipped with Rockwell-Nordstrom Hypreseal valves to assure positive shut-off, easy operation.

W7R and W7R-2, all tailored for extremely hard formation work and each suited for a particular variant in drilling conditions.

- The Type RG-1J "Tri-Cone," which replaces the R-1, R-1J, and RG-1. It is a tungsten-carbide insert bit developed for work in extremely hard, abrasive formations.
- The OSC-1G for use in medium-soft formations with hard streaks, such as unconsolidated sands, red beds, salt, anhydrite, medium-hard limestones, and medium-hard and unconsolidated shales.

With the strong swing toward air, gas, and mist drilling, increasing attention has been focused on improving bits for this technique.

Reed Roller Bit Co., for example, has changed the construction of its air bits by incorporating a single, large-area, finer-mesh screen to feed air to all three air passages to the bearings, instead of using individual strainers for each air passage.

Reed notes that with the individual strainer method the closing of even one air passage can cause that bearing to fail prematurely. Even though the other two bearings function perfectly, the one bearing that fails effectively shortens bit life.

The larger, single-screen provides a more balanced effect on bearings, and, therefore, bit life.

The company also has built additional gauge protection into its YG-3G sintered tungsten-carbide cutting element rock bit, which has been used extensively in air drilling. The bit is being introduced into fluid-drilling operations.

With the YHW-G rock bit, the company has employed the use of sintered tungsten-carbide inserts in tooth-type cutters to improve gauge protection, particularly in high-strength, tough formations.

The problem of maintaining hole gauge has come in for special consideration.

In this connection, Security Engineering division of Dresser Operations, Inc., has recently introduced its H7T-W rock bit. This bit features two cutter cones bearing T-toothed gauge rows and a third cone utilizing a circumferential web while the T-teeth aid penetration with lower weights, a particular advantage in crooked-hole country, where the use of higher weights is a prime cause of deviation problems.

For drilling in chert and other hard formations, Security has tackled the gauge problem with its H9 insert bit in which some of the inserts, or compacts, are so arranged as to "follow" others and keep the hole diameter constant.

One of the new departures in design is the slanting of the nozzles in a jet bit in order to sweep cuttings away from the teeth.

Developed by the Oil Tool division of Chicago Pneumatic Tool Co., the "Slant Jet" was put into production only a few months ago—first, in medium and soft formation types with other versions suitable for various formations to follow.

Key to the bit's performance is three forwardly inclined jet nozzles. These aim the fluid stream at the hole bottom immediately in front of the cone teeth and in the direction of bit rotation.

The principle involved is sweeping of the cuttings clear of the teeth, exposing clean formation for cutting action and avoiding dispersal of the cuttings into the path of the cutters.

Other variations in bit manufacture seek to combine different characteristics for higher performance.

One of these is the VH2-G bit, made by Varel Manufacturing Co. for medium-hard formations. The bit has

Shown above is a quarter section view of the Hercules Type RC Tubing Head and at far left the same head on a well in water flood project at Electra, Texas.

Write for complete information or personal help from our staff to assist you in your water flood projects.

HERCULES WELL HEADS for use with REDA PUMPS...

Hercules Well Heads, designed for use with Reda submersible pumps, contain the same high quality workmanship and materials found in Hercules Conventional well heads. They simultaneously pack-off the inner string and Reda cable by means of custom-made metal and neoprene packing rings for each tubing-cable or casing-cable combination.

HERCULES TOOL COMPANY

MANUFACTURERS OF OILFIELD EQUIPMENT

GENERAL OFFICES AND PLANT • TULSA, OKLAHOMA

Export Representative Oil Field Equipment Co., Inc. 90 West Street, New York, N. Y.

chiseled teeth with a tungsten-carbide reinforced special design on the gauge.

Varel also is producing the VH1-M for use in formations slightly softer than the hardest rocks. The latter are drillable with Varel's VH1.

Hunt Tool Co. is putting out a combination type bit that incorporates two tooth-type cutter cones on the periphery of the bit and drag-type blades in the center.

Hunt says the cones promote a constant rate of penetration, while the drag cutters remove formations near the center of the hole more efficiently to accomplish maximum penetration at a uniform rate.

Phipps Drill Bit Co. has a four-jet bit with tungsten-carbide cutting blades. The company says the jet arrangement prevents drilling of oversized holes and permits easier flow of the cuttings up the annulus. Phipps says the four jets also help stabilize the bottom end of the drillstring, and so minimize deviation problems.

Tool Gives Continuous Check on Drift

A drift indicator service that provides a continuous check on hole deviation during drilling has been unveiled by Byron Jackson division of Borg-Warner Corp.

The all-mechanical sensing and signaling device generates deviation signals (pressure surges in the mud stream) that are received by a recorder located near the driller's station.

The recorder provides a permanent, easy-to-read deviation chart of each reading.

The system already has been field-tested for approximately a year in 15 California holes.

The tool, known as the BJ Teledrift, can take a reading with the mud pump shut down from only 45 to 60 seconds. No special tools need be run in the hole and there is no need to roundtrip.

These factors contribute to speedier making of hole, says BJ.

The Teledrift provides an automatic reading every time the mud pump is shut down, as when a single joint is added to the drill string.

There are other advantages claimed for the tool:

- Fast, frequent readings permit the driller to keep heavier weights on the bit, with increased penetration rates.
- The tool has been field-tested to 12,000 ft., with no effect on signal strength or reliability.
- Readings can be made in unstable formations. The short non-circulating period of less than one minute minimizes the danger of stuck drillpipe.
- Lost circulation materials are readily passed through the downhole sub, since the flow passage areas exceed those of drill collar bores.

The sensing and signaling device is contained in a 7-ft.-long Teledrift sub made up in the drillstring just above the bit.

BJ says that the tool is available in subs from 5½ in. outside diameter, and up.

The tool generates a maximum of seven pulses, each representing an increment of hole angle—usually ½ degree per pulse. It can be shop-adjusted to measure any seven angles of deviation up to 10½ degrees from vertical.

The device has a liquid-filled instrument casing, or housing, and a plunger that extends upward from the housing by spring action. The plunger has a head, or enlargement, that traverses a series of seven annular restrictions in the drillpipe to produce the signals.

The instrument housing also has an equalizer diaphragm, or bladder, which keeps pressure inside the tool equal to pressure on hole bottom.

When downward flow of the drilling fluid is stopped, the plunger extends upwards along the series of restrictions to whatever degree is permitted by a pendulum that moves along a series of graduated shoulders (see drawing).

When the flow of drilling fluid is resumed, the force of the stream against the plunger head drives the plunger slowly back to its normal retracted position, with consequent creation of the deviation signals.

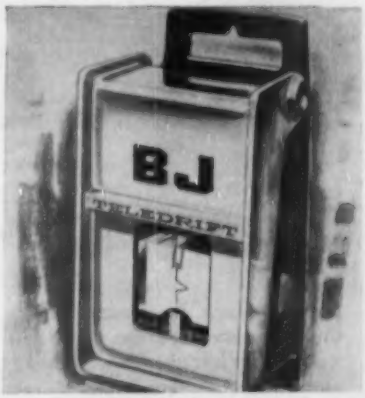
For example, if the plunger moved up to the fifth annular restriction, the resumption of fluid flow would force the plunger down past five restrictions, each of which would give off a signal (pressure pulse) equal to half a degree of variation.

The plunger and the pendulum are operatively related by a patented coding rod system that controls the travel of the plunger.

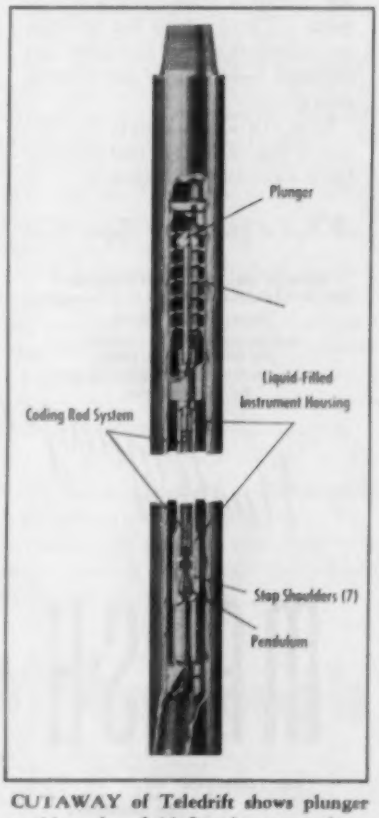
The pendulum moving along the graduated stop shoulders controls the upward move of the plunger.

The nearer to vertical the borehole, the longer the movement of the controlling pendulum, and the shorter the movement of the signal-producing plunger.

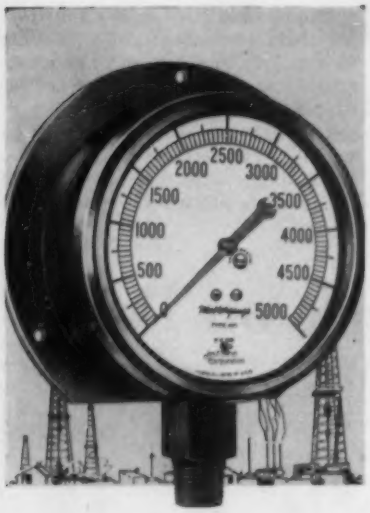
This leads to easy interpretation of the charts, since the number of pulses varies directly with the deviation of the hole from vertical.



BJ TELEDRIFT indicator gives automatic, continuous recording of drift.



CUTAWAY of Teledrift shows plunger position after fluid flow has stopped.



Wherever oil flows–

"Mastergauge" has been accorded top preference because it has set its *own* standards. Mastergauge alone has the "Conoweld" leak-proof, one-piece tube and socket; the sturdier "Marshalloy" case; the precision Mastergauge movement . . . and a long list of other features that give it precision and stamina beyond any other pressure gauge.

It is standard bearer for the broad line of Marsh instruments for the petroleum industry.

In stock at your nearest Supply House

MARSH INSTRUMENT COMPANY
Division of Colorado Oil and Gas Corporation
Dept. 53, Skokie, Ill.
Marsh Instrument & Valve Co. (Canada) Ltd.
8407 103rd St., Edmonton, Alberta
Houston Branch Plant, 1121 Rothwell St.
Sect. 13, Houston, Texas

Mastergauge
by
MARSH
"THE STANDARD OF ACCURACY"

Rig Design: Key to Cheaper Moves

Today's method of moving and assembling rigs by no means will be adequate in the future, says Marvin T. Parker, Great Western Drilling Co.

Deeper drilling requirements and the accompanying larger equipment, highway load restrictions, and increased moving costs (now 20% of the total drilling cost in some areas) force the operator of drilling equipment to be constantly alert for better and more economical methods.

Design engineers have done much to facilitate fast installation, Parker said, but emphasis on good design for moving rotary rigs will be stressed much more in the future than in the past.

The future rotary rig should be designed to be moved and assembled in a few hours, Parker maintained.

Introduction of light-weight alloy structural materials has given the engineer a new design tool and should result in less weight to perform the same job, he predicted.

Parker noted the gains made in rig moving and assembly by use of the electric drive rig, step-down substructure arrangement of equipment, and other time-saving equipment and ideas.

It's possible that design and use of the electric-wheel, high-load capacity trucks now in use might be carried further.

These trucks, Parker reported, are designed to transport heavy loads without building roads in desert areas and over other trails where large rocks, trees, and severe grades have been removed.

Each of the large low pressure tires has an individual electric motor whose power source is an engine and generator set with an electric conductor to each wheel.

The possibility of designing a rotary rig around this electric wheel drive for faster moving is not too far-fetched, Parker said.

"The truck could be an integral part of the rig with the rig power furnishing the power to the electric wheels for moving.

"Some modification of present day substructure may be possible to utilize the electric wheel for 'rig-skidding' and then removed for other applications.

"Some of the large capacity trucks on the market today might be utilized to move a complete mast strung up with blocks and drilling line if the mast could be modified to strengthen the angle braces where it would be supported by the rolling tail board and headache rack.

"All auxiliary equipment could be skid-mounted on large skids and the number of loads decreased."

Parker, who is manager of drilling at Great Western, spoke this week in New Orleans before the Petroleum division of the American Society of Mechanical Engineers.

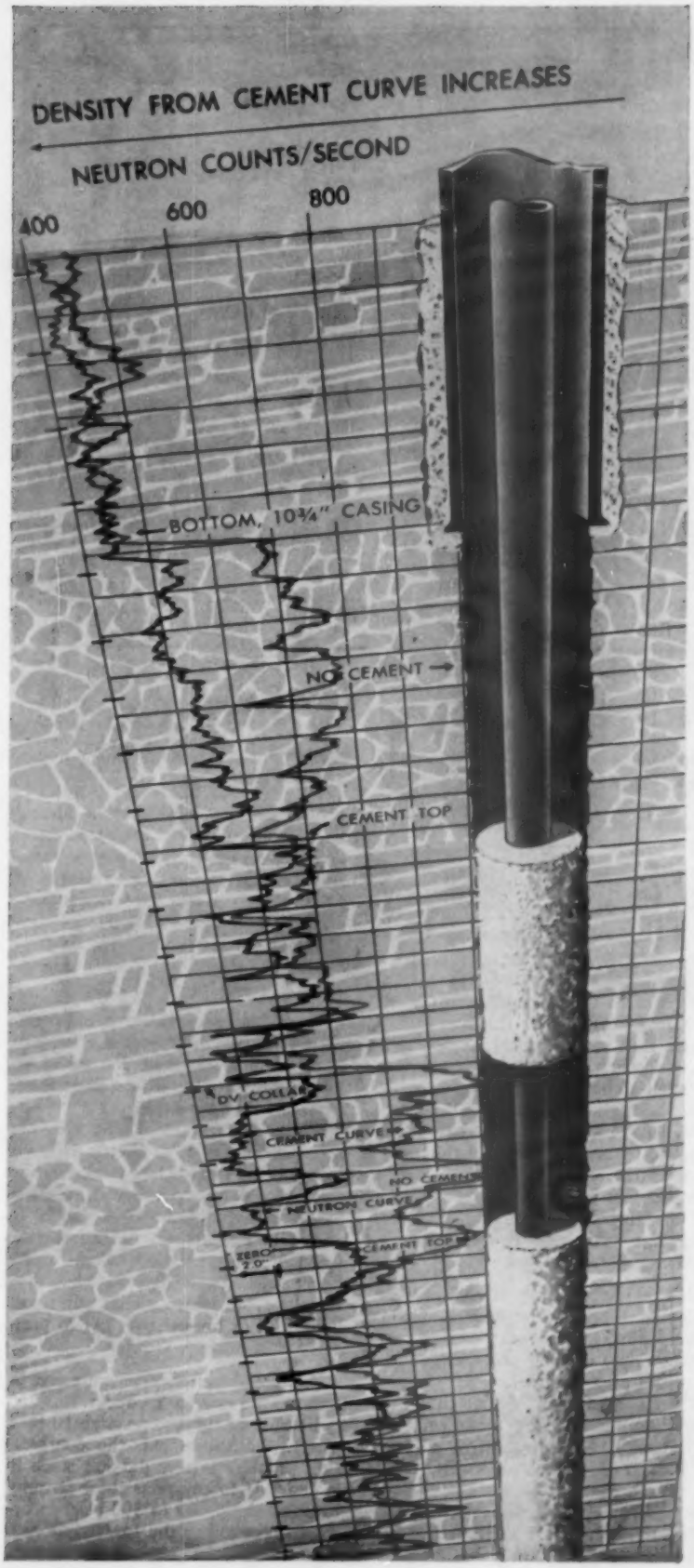
Along this same line, just two trucks (no crane) were required recently to move a rig 2 mi. in Alaska (picture).

The move, which was made by Clyde Hall Drilling Co., was between Richfield Oil Corp.'s No. 1 Kaliakh River Unit and No. 2 Kaliakh River Unit in the Cape Yakataga area.

Two Autocar trucks with conventional drive-shaft drive—each equipped with 1⅛-in. winch lines of 80,000 lb. capacity—were used.

The rig, a National 110 with a 142-ft. mast, was being used to spud in at the new hole 5½ days after drilling was suspended on the first.

JUST TWO TRUCKS without a crane were used in moving drilling rig 2 mi. in Alaska.



McCullough

NUCLEAR CEMENT LOG

with Scintillometer ®

–lets you SEE

your cement column

Here's an improved cement locating log that accurately "pictures" the cement column in your well. It will identify the presence of the cement column, confirm the quality of the job, locate cement tops, indicate uncemented sections and possibly detect channeling. It is equally effective in new wells or in old wells of any age.

The McCullough Cement Log records a curve which reflects the density of the material behind the casing. Thus, the location and characteristics of the cement column, when it differs in density from the displaced fluid, can accurately be determined.

This log is usually run on the same trip into the well with other nuclear well surveys, thus requiring no extra rig-time. In fact, the cement curve can be one of six separate logs, all revealing different down-hole information, that may be obtained on a single run without coming out of the hole. Also, it is very economical, price-wise, when run in combination with other nuclear logs.

Proved thoroughly effective on hundreds of jobs, the McCullough Cement Log is being adopted as standard procedure for determining the effectiveness of the primary cement job, checking squeeze jobs and for use in future workover or remedial operations.

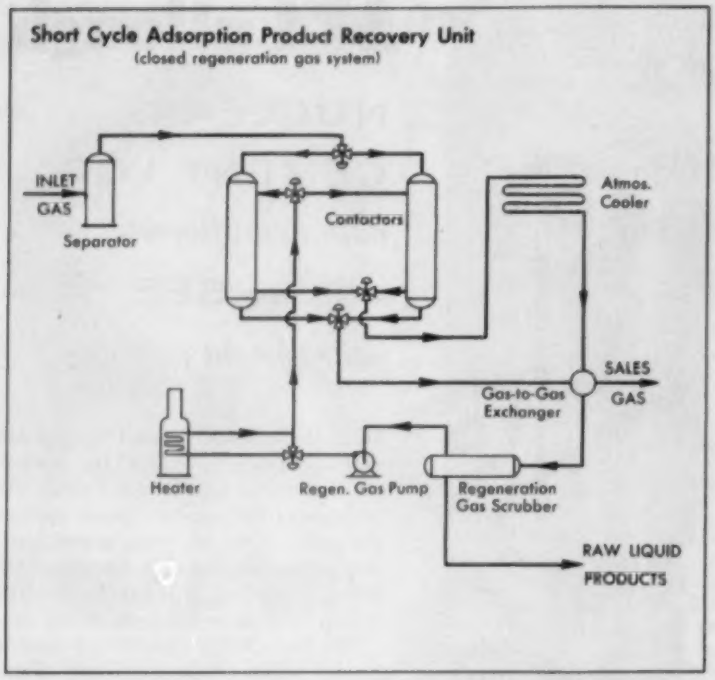
The Cement Log shown at the left is made up of sections of an actual log run in 5½" OD casing from 3800' to surface. All information shown is exactly as it appeared on the original log.

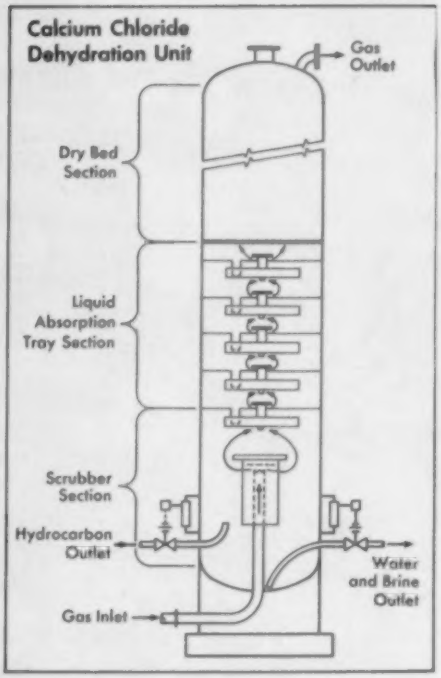
McCullough

TOOL COMPANY

Los Angeles • Houston • Edmonton

Cable Address: MACTOOL





More, Better Gas Facilities Coming

Many new developments in facilities for handling field gas are in the offing.

The phenomenal growth of the natural gas industry in the past 15 years has brought into sharp focus the fact that engineers now need to know much about processes and equipment used in the field to separate, compress, dehydrate, and process gas.

And as the demand for natural gas and liquids continues to grow (they now supply about 30% of the nation's energy requirements), new developments in processes and equipment will continue to come.

A few of these developments needed and expected in the future were outlined this week by William D. Clift, Roy R. Die, and Harold R. Galloway, Humble Division of Humble Oil & Refining Co., at the annual meeting of the Petroleum Division of the American Society of Mechanical Engineers at New Orleans, La.

One promising development now in the works pending solution to a mechanical problem is the turbo-expander.

This, the engineers said, is a small, experimental, high-pressure gas-powered turbine that drives a compressor and is used in place of a choke in conventional low temperature separation.

In operation, inlet gas is expanded through the turbine, rotating it at a speed of approximately 35,000 rpm. The chilled gas stream leaving the low temperature separator is recompressed by a compressor that is powered by the turbo-expander.

By removing energy from the system, the temperature drop when the inlet gas is expanded through the turbo-expander is 1.6 to 1.8 times greater than the drop obtained by expansion through a choke.

The longest test to date was a 150-hour run that resulted in recovery of 4 bbl. per million cu. ft. of gas compared to a recovery of 2.95 bbl. per million when the gas was produced through a choke into the low temperature separator.

During tests, the unit has been plagued by bearing failure of the high-speed turbine. When a bearing is developed that will operate satisfactorily in the turbo-expander, the Humble engineers said, this equipment will have many applications.

It's probable that attractive development can be expected in the use of adsorption processes that are more widely used in chemical, refining, and other industries.

Much additional work, the trio said, can be done by manufacturers to increase the utilization of adsorption processes by gas producers.

More design criteria and calculation methods, they said, are needed for production engineers to properly evaluate the processing, dehydration, and sweetening of multicomponent hydrocarbon gas streams.

Specifically, consideration should be given to the problem of economically recovering the liquid components in gas streams at pressures of 1,500 to 1,800 psig. by adsorption.

This development, the Humble researchers said, would find use in small field cycling projects where conservation of liquids could be affected.

Gas producers would readily accept small gas turbine-driven centrifugal compressors that can compete in initial investment with conventional compressor equipment.

These machines now, the Humble men said, are adaptable only to large installations where compression ratios are low and horsepower requirements are in the neighborhood of 2,000.

Additional work, they added, should be done to utilize centrifugal compressors in the 50 hp. to 1,000 hp. range for compressing relatively small quantities of low-pressure gas to pressures of 800 to 1,000 psig.

A closely related problem exists in collecting stock tank vapors.

Because of the low pressure (0 to 2 psig.), the trio noted, the compression problem is very difficult since it is desirable to compress these streams to pressures of 100 to 300 psig. in order to best utilize the gas.

And since this gas is rich in liquid

components, condensation of these liquids presents a problem.

The relatively new screw-type cycloidal rotors, they said, seem to offer a great deal of promise in this field since they can effectively handle the gas whether it is one phase or a mixture of gas and liquid.

Most of these units, they added, aren't capable of discharge pressure above 50 to 60 psig., but would find ready acceptance by the producer if they were capable of compressing stock vapors to higher discharge pressures.

One of the particularly significant developments is the short cycle adsorption product recovery unit.

These, the engineers defined, are similar in appearance and operation to conventional solid dessicant dehydration units. The process has become well established as a method for recovering 12 to 14 lb. RVP (Reid vapor pressure) stock tank product from relatively lean gas streams that can't be economically processed in conventional oil absorption or refrigeration plants (drawing, page 42).

Since their introduction in late 1955, approximately 150 short cycle units representing an investment of about $11.5-million have been bought by the industry.

These 150 units, the researchers said, have a design gas-processing capacity estimated at 2.7-billion cf/d and a design product-recovery capacity of about 8,700 b/d.

The economics of installing short cycle units usually preclude their use for gas volumes less than 5-million to 10-million cf/d.

And, the engineers added, for short cycle units to be attractive, the gas volume and composition should be such that the potential recovery is at least 20 b/d of stock tank liquid.

An important feature of these units is that gas is dehydrated at the same time liquids are being recovered.

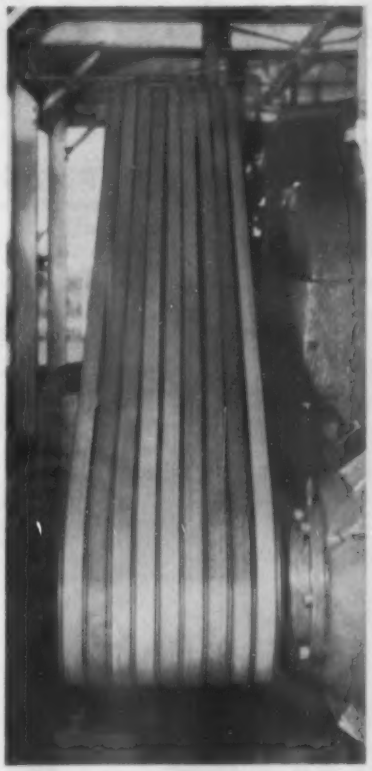
The units are designed for either open or closed regeneration systems. Whether one is superior to the other is open to question, which as far as the producer is concerned, can be answered only by evaluation of each application.

Calcium chloride dehydration units also are an important current development in field gas handling.

These units, which have no moving parts except for two dump valves, combine the water adsorption qualities of the brine solution with the deliquescent qualities of the solid calcium chloride (drawing, page 42).

This combination, the Humble trio said, allows the water removal capaci-

SAME JOB Fewer Belts . . . Narrower Sheaves Less Bearing Load . . . Lower Costs



Conventional V-Belt Drive

Thermoid-Quaker "Powerflex Wedge" V-belt drive

Quaker Thermoid "POWERFLEX WEDGE" V-BELTS SAVED $402 ON THIS JOB

The shape of new "Powerflex Wedge" V-belts is narrower with added depth . . . for a big jump in "pulling" power. More pull means fewer belts, smaller sheaves, shorter centers and less bearing load; *more efficient power transmission.* Costs on this documented "Powerflex Wedge" installation amounted to a savings of $402.14 over the conventional V-belt drive.

But design isn't the whole story! New Thermoid-Quaker rubber compounds and tougher, load-carrying cords play a vital role in prolonging belt wear . . . for even greater savings.

Check "Powerflex Wedge" V-belts for better power transmission. Your Thermoid Division Distributor is there to serve you. *Thermoid Division, H. K. Porter Company, Inc., 200 Whitehead Road, Trenton 6, N.J.*

THERMOID PORTER DIVISION

H. K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

ty of a unit quantity of calcium chloride to be increased enough to make the process competitive with regenerative dessicant processes.

The units appear promising for offshore and other locations where the installation of heaters is not desirable for safety reasons.

Other advantages include the absence of fuel requirements and simplicity of working parts and controls. Just two liquid level controls are needed—one to dump accumulated water and brine, and a second to dump liquid hydrocarbons.

More Offshore Automation Due

Considerably wider use of automatic lease systems offshore can be expected within the next few years says William J. Rapson, Jr., Garrett Oil Tools division of U.S. Industries, Inc.

Rapson told this week's meeting of the Petroleum Division of the American Society of Mechanical Engineers that automation developments offshore should roughly parallel the automatic techniques used onshore.

Automatic controls have been widely applied to safety shut-down systems on offshore production installations to protect sizable capital investments, he added.

Rapson said the use of other phases of automatic lease systems, however, such as automatic well testing, automatic custody transfer, and remote supervisory control has been limited.

He added that the past reluctance of some operators to use the new techniques was caused by lack of suitable equipment and a lack of clear understanding as to the advantages available from various phases of automatic lease systems.

Justification for the use of automatic metering and controlling techniques is based primarily on savings obtainable in capital expenditures and operating costs, he said.

There is more incentive to achieve a better economical solution offshore, Rapson continued, because offshore facilities cost more and because operating expenses are much higher.

Rapson noted, however, that some phases of automatic lease systems offer considerable savings, while other phases may be expensive and allow only small returns. If the economic study is not thorough and by phases, he cautioned, optimum return on the investment may not be obtained because of marginal expenditures.

"Lease automation is not a panacea. It is an advanced tool to be used by industry in the ever pressing effort to reduce costs and increase operating efficiency," Rapson said.

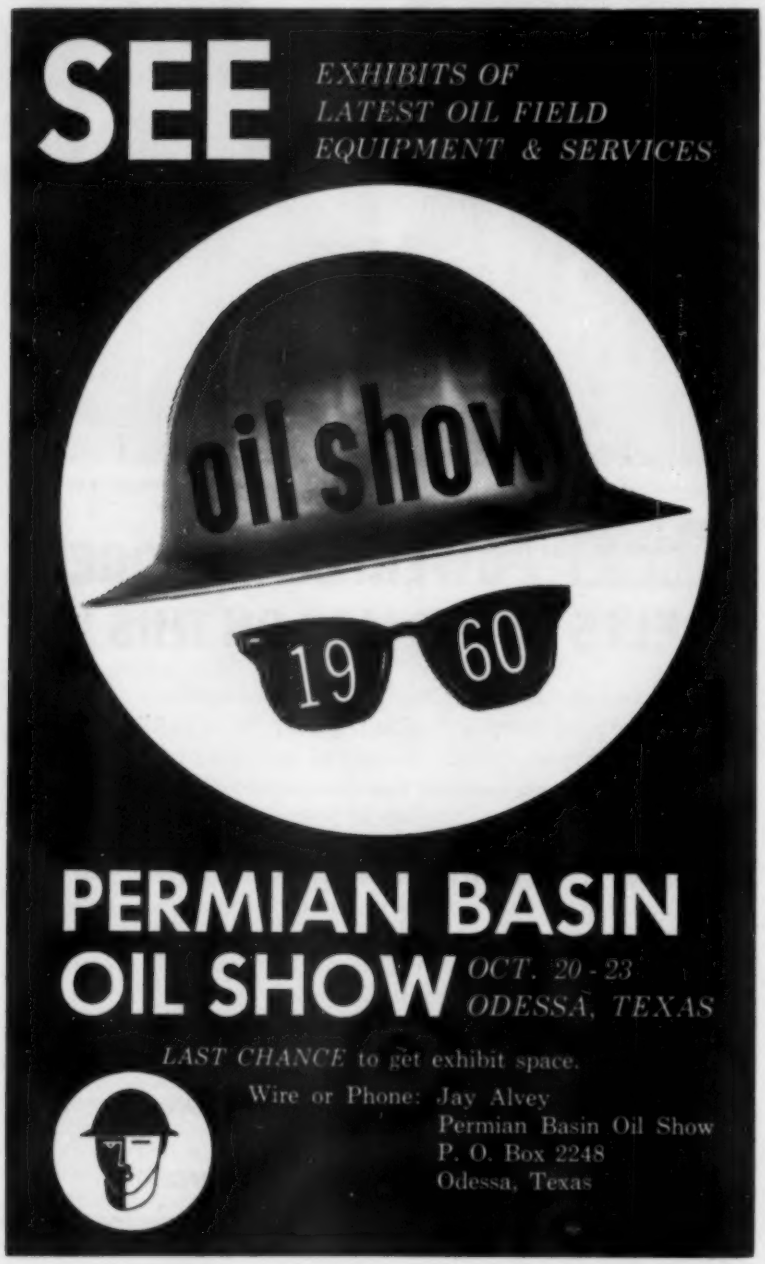
Totally unattended production stations are being considered in efforts to attain maximum savings in manpower and transportation costs.

Rapson reported that several gas-condensate producing facilities have been operated successfully without local personnel. But, he continued, unattended operation has not been used in the major offshore producing fields.

Production platforms are without personnel in direct attendance for periods of days, Rapson said, but most operators feel that longer periods would not be practical at this time.

Equipment is now available to effect total automatic lease control, Rapson reported.

He added that there is need for improvement in the life of some items, and a need for lower costs in some techniques, "but the job can be done."



GO PIGGY-BACK* AND SAVE

*PARKERSBURG ELEVATED ELECTRIC PUMPING UNIT BASE

If you power with electricity, you save three ways with **Parkersburg's Elevated Electric** pumping unit base. You save up to 20 per cent on the concrete in your pumping unit base. You save on the shorter belts driving your unit. Most of all, your prime mover will last longer when mounted above ground and protected from dust and grit. Parkersburg's all-bolted construction permits immediate conversion to other-style pumping unit bases, in the event your unit ever requires another type of prime mover. **Check this feature** before you buy! Then, call your Parkersburg man, or see your dealer representative today.

Parkersburg Pumping Units Are Available Through the Following Supply Stores: American Pipe & Supply Co., Beacon Supply Co., Bovaird Supply Co., Canadian Equipment Sales & Service Co., Ltd. (Canada), Franklin Supply Co., Franklin Supply Co., Ltd. (Canada), Houston Oilfield Material Co., Inc., Industrial Supply Co., Iverson Supply Co., Mid-Continent Supply Co., Midland Supply Co., Inc., Mountain Iron & Supply Co., Oil Equipment, Ltd. (Canada), The Producers Supply & Tool Co., Republic Supply Co., Rodman Supply Co., Superior Iron Works & Supply Co., United Supply & Manufacturing Co., Wilson Supply Co.

THE PARKERSBURG RIG & REEL COMPANY
Division of Parkersburg-Aetna Corp.
PARKERSBURG • HOUSTON • COFFEYVILLE

What's New / IN EXPLORATION, DRILLING, PRODUCTION

Unique Pressuring Project Succeeding in Texas

Mobil Oil Co. reports that its miscible-phase pressure maintenance program in Parks field unit, Midland County, Tex., is paying off.

The project, started in 1957, was the industry's first major field-wide pressure maintenance program based on injection of propane, followed by dry gas.

R. D. Hanley, vice-president of Mobil's Midland exploration and producing division, terms the project "a major engineering success."

He adds that oil production has increased from 325 b/d to 1,700 b/d, and that the life of the field is expected to be doubled.

Since the project began, Mobil has injected 64-million gal. of propane followed by 6.5-billion cu. ft. of gas.

"With the propane-gas system followed by water injection," Hanley adds, "we ultimately expect to recover about 55% of the originally in place, compared to 17% by primary production, and an estimated 41% by straight waterflooding."

•

Unitization May Resolve Lisbon Field Spacing

A 14,080-acre unit has been suggested for Utah's Lisbon field as a possible solution to spacing problems.

The state oil and gas conservation commission has postponed to Oct. 4 a scheduled Sept. 13 hearing on the spacing issue.

Pure Oil Co., which discovered the field, would be operator of the unit. The field produces gas from the Mississippian and oil from the Basal Mississippian and Devonian.

Unit participants, in addition to Pure, would be the Humble division of Humble Oil & Refining Co.; Pubco Petroleum Corp.; Elliott Production; Standard Oil Co. of California, Western Operations, Inc.; Belco Petroleum; and Quintana Petroleum Corp.

Pure's original spacing proposal called for 640 acres for the gas area and 80 acres for the oil section. Elliott said it wanted 160-acre spacing for both; Stancal asked for 320 acres for the gas area but did not mention the oil; and Pubco has asked for 320 acres for the gas and 160 acres for the Devonian oil.

•

Oil companies have been given the green light by the Interior Dept. to carry out geological and geophysical surveys on the Outer Continental Shelf off the Atlantic Coast.

Similar operations have been authorized previously for federal waters off Georgia and Florida, under cooperative agreements with those states.

•

Pure Oil Co. is reorganizing its field exploration activities by replacing 21 district offices with 9 area offices.

Harris Van Zandt, vice-president for exploration and production, said the nine area exploration offices had been selected because they were in regions of the greatest exploration activity.

The new offices will be at Durango, Colo.; Casper, Wyo.; Oklahoma City; Newark, Ohio; Houston, where two offices will be set up; New Orleans; Midland, Tex.; and Roswell, N. M.

•

The California State Lands Commission may offer for lease an offshore tract of some 2,560 acres west of West Montalvo field, Ventura County.

The proposed lease lies south of a state lease granted to Standard Oil Co. of California in 1952, which is presently the site of 11 deep wells directionally drilled from onshore locations.

The commission has already given notice of intention to consider offering leases for the area.

•

Shell Oil Co. of Canada, Ltd., paid a total of $1,071,263 for three parcels in Alberta's recent sale of drilling reservations.

The entire Sept. 8 sale netted $1,513,851 for ten parcels totaling 72,541 acres. All three of Shell's parcels are in northwestern Alberta.

•

Jerry F. D'Arcy, former president of Arrow Drilling Co. Ltd., Calgary, has purchased all assets of Can-Tex Drilling & Exploration, Ltd.

Assets include ten drilling rigs, which will be operated under the same name. Sales price was not disclosed.

•

Engineering

Du Pont is test-marketing a new plastic pipe for potential application in flow lines, gathering lines, salt water disposal, and waterflooding.

Du Pont says the pipe, which is made from Delrin acetal resin, has excellent fatigue endurance under pressure-surge conditions, and has outstanding solvent resistance and dimen-

Rig Specially Built

The mobility of trailer mounting with the stability of a conventional substructure are combined in this new Continental-Emsco rig, built for R. L. Manning Co., Denver.

Manning and Continental-Emsco collaborated in the design of the rig, designated the T-97-GB-250T. It was prompted by a Manning cost analysis of transportation, rig-up, and teardown expenses.

The mast travels on a single trailer, while the drawworks, compounding transmission, and engines are substructure mounted.

sional stability over a wide temperature range.

•

An automatic gas desulfurizing unit has been developed by Maloney-Crawford Tank & Mfg. Co.

Called "Sweet-A-Mine," the unit is of the amine type, and removes hydrogen sulfide and carbon dioxide from gas by absorbing them in a solution of monoethanolamine in water. The resulting sour amine solution is regenerated for re-use.

•

An oil seal that makes possible sealed-in oil lubrication of wristpin bearings on pumping units has been announced by the pumping unit division of Parkersburg Rig & Reel Co.

The unit, which takes the place of grease gun lubricants, is said to require no maintenance for the life of the lubricant. The seal will be guaranteed for 200,000 operating hours of service on Parkersburg pumping units.

•

Drilling Highlights

West Texas—Monsanto Chemical Co. No. 1 Birge, labor 14, league 294, Lynn County school land survey, Gaines County, was completed for 120 b/d of 34-gravity oil through 14/64-in. choke and perforations at 12,781-85 ft. in the Devonian. The well is 3 mi. east of Champmon field.

In Borden County, Gulf Oil Corp. No. 1 B. S. Welton, section 23, block 30, T5N, T&P survey, flowed 225 bbl. of oil in last five hours of a six-hour drillstem test at 8,470-91 ft. in the Ellenburger. An earlier 11-hour test at 8,214-96 ft. in the Pennsylvanian yielded 5,240 ft. of oil and 540 ft. of gas- and oil-cut mud. The dual prospect is 3 mi. southeast of South Gail pool.

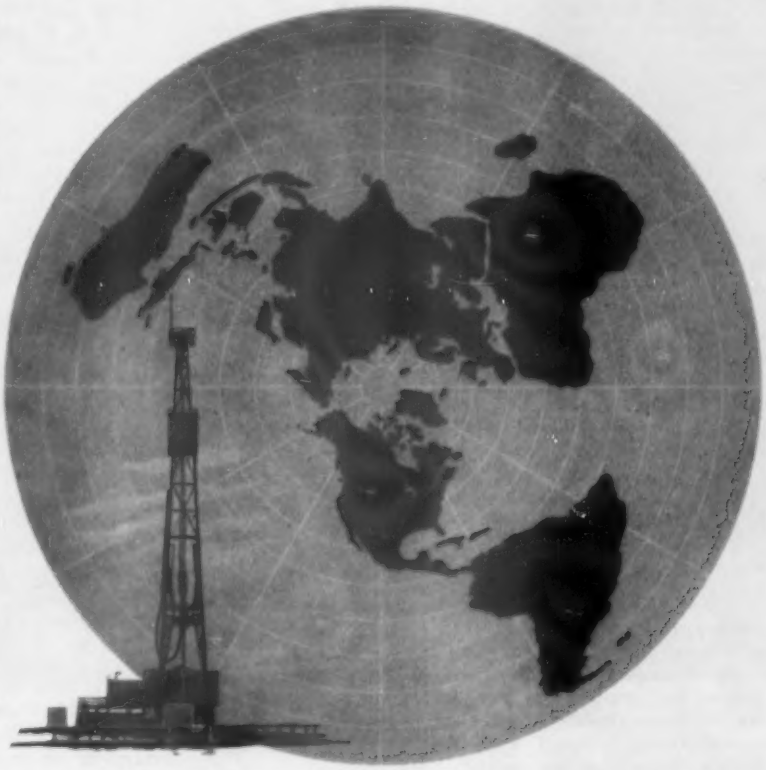
Oklahoma—King-Stevenson Oil Co. and Calvert Petroleum Co. No. 1 Pacula, section 14-19n-6w, East Hennessey pool, Kingfisher County, was completed as a pay opener for 384 b/d of oil through perforations at 6,395-437 ft. in the Red Fork. The well subsequently has flowed oil from the deeper Manning and Meramec formations. Nearest Red Fork production is 3 mi. southwest in Southeast Hennessey pool.

Wyoming—Union Oil Co. of California No. 1 Government, section 29-37n-64w, Niobrara County, recovered 370 ft. of oil-cut water and 76 ft. of oil-cut mud on drillstem test at 7,844-970 ft. after recovering 280 ft. of oil and 110 ft. of heavily oil- and gas-cut mud on drillstem test at 7,752-815 ft. Recovery is believed to be from the Dakota. The wildcat is 5 mi. north of East Lance Creek field.

North Texas—H. J. Hartwell No. 1 C. F. Kibler, D. A. Norton survey, Jack County, was completed for 220 b/d of 42-gravity oil through 24/64-in. choke and perforations at 5,934-50 ft. in the Atoka conglomerate. Comparable production is 3½ mi. southeast in the Chico area.

Also in Jack County, Brown Oil Co. No. 1 Seth E. Wampler, L. Bonilett survey, was completed for 465 b/d of 41-gravity oil through 20/64-in. choke and perforations at 4,929-36 ft. in the Pennsylvanian. The discovery is 1½ mi. northeast of Rusmag field.

Montana—Signal Drilling & Exploration No. 1 Anderson, section 13-32n-58e, Sheridan County, recovered 360 ft. of oil, 60 ft. of oil-cut mud, 180 ft. of mud-cut oil, 90 ft. of oil-cut water, 330 ft. of mud- and oil-cut water, and 120 ft. of salt water on 90-minute drillstem test at 7,755-824 ft. in the Ratcliffe. The prospect is 2½ mi. northwest of Dwyer field.



RIGS AROUND THE WORLD...

From its first foreign drilling contract 30 years ago in Venezuela, Drilling and Exploration Company, Inc., has expanded throughout the world. Governments, majors, and independents rely on Drilexco's knowledge, experience and skill to satisfy their many drilling requirements.

DRILEXCO Dallas

Drilexco rigs and crews are now operating in Alabama / California / Louisiana / Mississippi / New Mexico / Texas / Brazil / Costa Rica / Holland / Iraq / Libya / Nigeria / Portuguese Guinea / Turkey.

DRILLING AND EXPLORATION COMPANY, INC.
600 EXCHANGE BANK BUILDING • DALLAS, TEXAS • CABLE: DRILEXCO—DALLAS

Adversity Isn't Slowing Drillers'

Drilling contractors are in as tight an economic squeeze as ever. But new tools, techniques, and operating procedures are helping them to combat their problems.

The drilling industry—however lean and hungry it may be—continues to probe, experiment, and evaluate on a broad, developmental front.

Despite the adverse economic conditions of the present, superdeep drilling is no longer a question of "how," but more of "when."

Slim-hole drilling and tubingless completions are growing methods. Recent studies indicate a leaning toward 6¼-in. holes and 3½-in. pipe. Operators are confident that any existing tool gap for workover problems can be met promptly and adequately.

Thinking apparently is approaching the point where cumulative hole deviation during drilling will be less important than the angularity within a relatively short vertical distance. This probably means that standard contract deviation clauses are in for a thorough revision, including recognition of variation in deviation tendency between areas.

At least one West Coast major—and probably many other operators, too—is using computers to plan difficult drilling programs. The use of electronic brains to control certain drilling operations is being considered.

Such pressures as the effort of haulers to secure government sanction of higher rates is spurring development of lighter, more portable rigs.

The stress on operator mud research currently is to find "what the mud will do" in order to plan better use.

Nowhere in the field of drilling research has there been a greater, more intensified effort than in the development of better drill bits.

There is a pressing, unrelenting demand from contractors and operators for bits that will make holes faster and for longer periods. And the strong competition among manufacturers, coupled with the drive for lower-cost drilling, helps push the search.

The result has been a virtual flood of newly designed rock bits in recent months. Taken collectively, these bits offer big improvements in operating characteristics (page 35). But the search goes on for even better bits.

The expensive hunt for a drilling tool or system that can appreciably cut general drilling costs continues on many fronts.

L. W. Ledgerwood, Jr., head of the drilling and development section of Jersey Production Research Co., Tulsa, said recently that the industry has spent more than $25-million in efforts to develop systems more economic than rotary drilling, with as much as $1-million a year being spent on a single tool or development.

Ledger noted that at least 34 different investigators have participated in the testing of 20 different tools or systems. But all this expense and effort, he said, has not resulted in any development that can appreciably cut general drilling costs, though there are some cases where the new tools are more economic under specific, limited conditions than is rotary drilling.

Ledgerwood may have put his finger on the major barrier to successful development of a satisfactory new drilling system when he said: "With only a few exceptions, past developments have been aimed at making equipment to implement preconceived ideas of drilling tools and systems, rather than at defining the most effective way to break rock, and then building the needed system. The industry's problem is not a development problem; it is a research problem."

There is considerable research, too, on all facets of optimum rig hydraulics.

For something like a decade, jet bit drilling has been a reality, yet its full potential is still unknown.

The over-all phrase, "optimum rig hydraulics," means, simply, the establishment of the most efficient relationships among all components, from jet bit nozzle sizes to weight on the bit and rotation speed.

In research along this line, the Carter division of Humble Oil & Refining Co. and Jersey Production Research Co. have just released some results of jet bit use in hardrock country.

The program was directed at securing better jet drilling performance in harder formations.

Among the tangible results is the recording of reductions in drilling time of 26% and 29% in two wells in the McElmo Creek field of northern Colorado.

In another instance, Carter engineers said that improved drilling practices and jet bits, and reduced hole size, cut total drilling cost by 36% in a hole in the North Tioga (N.D.) area.

As part of the same program, Jersey is evaluating the relatively efficiency of varying mud viscosities, circulation rates, pump liner sizes, and bit weights through analysis of cuttings, and is trying to find more effective means of obtaining reliable samples.

An extension of an "optimum hydraulics program" led Pan American Petroleum Corp. to redesign its drilling approach completely and to achieve significant per-well cost reduction.

Pan Am considers optimum hydraulics to be "a function of the formation itself, and not particularly applicable in hard-rock drilling"—a somewhat different view from that held by Jersey Research.

The whole jet drilling idea, a Pan Am engineer says, is to prolong bit life and obtain higher penetration rates by getting cutting away from the bit teeth as fast as possible.

Optimum hydraulics, therefore, is particularly important in the Gulf Coast area, he adds, where very thick sections of shale must be cut.

Push for Better Operating Methods

DRILLING'S OBJECTIVE: How to make crews such as this one operate more economically and more efficiently, and at a profit.

The redesigned drilling program included utilization of optimum-capacity rigs (often with torque converters), use of the most efficient bits, increased use of 4½-in. drillpipe, and optimum rotary speed, and adaptation of hole size to fit the combined demands of most efficient hydraulics and individual well conditions.

This attention to requirements of hydraulics, Pan Am says, accounted for more than 30% of the over-all reduction in well cost per foot that it realized—from $17.74 in 1958 to $15.86 in 1959.

Increasingly, the call for a bold approach to technical and economic problems is being sounded in the industry.

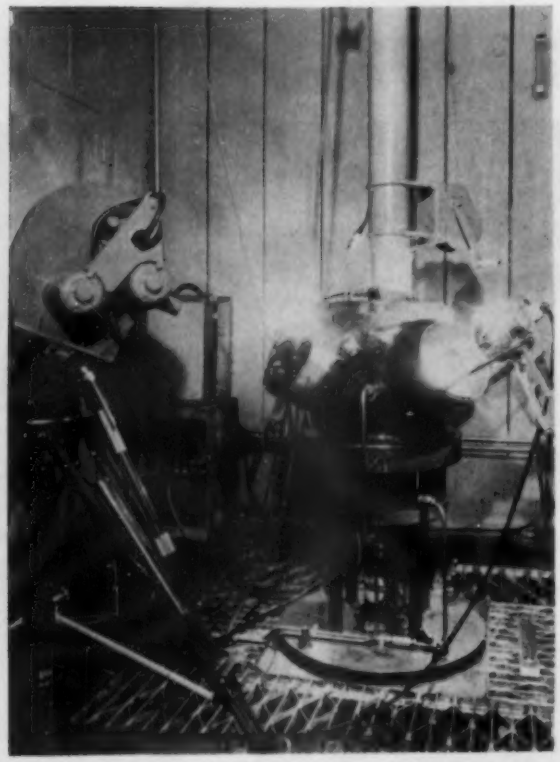
An area vice-president for a major oil company says bluntly: "We may be too cautious and may be taking too many precautions in drilling wells. Not too cautious from the standpoint of saving personnel or equipment, but from the position of whether we might lose the hole. Suppose you do lose a hole? If you lose only one out of ten, you save 20% or more on the cost of ignoring some of these precautions, you're still ahead."

Citing "fear in the wrong places," for holding up such advances as the general use of smaller pipe, an engineer for a major oil company declares:

"The payoff will be this—those who survive will be those who are bold. To be conservative and wrong is just as bad as to be bold and wrong. A small net profit doesn't mean you are successful, just as there are relative degrees of success. A little more boldness might have meant much more profit."

One new approach that is paying off is Jersey Production Research Co.'s "partnership" program, whereby research scientists are being sent into the field to work with drilling personnel in a effort to cut costs.

continued ▸



PRESSURE CHAMBER is used to measure rock strength. The high-speed camera records chisel action through the "portholes."

ALUMINUM PIPE, widely used in the oil patch for flow lines and the like, now is being field-tested as drillpipe.

The program is designed to develop a closer alliance among the researchers, field engineers, and drilling personnel, and to tailor Jersey affiliate and industry know-how, as well as the results of research, to achieve the lowest possible field drilling cost.

The program was kicked off in 1958 in cooperation with Carter Oil Co., now an operating division of Humble Oil & Refining Co. Since that time, it has been expanded to include affiliated companies throughout the world.

Results are typified by experience in the Williston Basin in North Dakota, where drilling time in one field was reduced by more than 40%. Prior to 1959, drilling cost in this field was $73,000 per well. Now similar wells are drilled for $47,000. In Venezuela, drilling time was reduced 43% in one deep area. And in one northern Alberta field, drilling time has been reduced by 20%. Other areas of the world show comparable results, according Jersey Production.

Says Alan P. Roberts, a Jersey Production section head, "The Jersey research program of carrying the results of research to the field is being accelerated to help the operating people squeeze every last dollar from their drilling costs."

Aluminum Drillpipe in Field

One of the biggest news items in drilling technology today is the fact that aluminum drillpipe now is in the field. Within the next few months, the drilling industry should know something about its operational potential.

The introduction of extruded aluminum drillpipe to the field has been years in coming, but its arrival was forecast a long time back (PW—Oct.5'56,p13).

Aluminum has been in oilfield use to some extent for years, primarily as line pipe and gathering or injection lines.

But use of aluminum pipe for drilling has been entirely experimental, and on a very small scale.

Only recently has it been put into the field for use in actual drilling operations—still on an experimental basis, it is true, but under actual field conditions.

At the moment, one 9,000-ft. string of 4½-in. drillpipe manufactured by Reynolds Metals Co. has been shipped to Shell Oil Co., and reportedly either is in use already or will be in the near future.

The shipment included 319 joints of 4½-in. drillpipe, Range Grade 4, weighing 8.60 lb. per ft.

Each of the 30-ft. joints, with tool joint attached, weighs just 343 lb. (compared to about 535 lb. for a comparable joint of steel pipe). Thickness of wall is about ½ in. (compared to steel's .337).

Instead of being upset, the pipe has an extra-length "fade-out" section of additional thickness at the box end. This thickening of the wall is achieved during the extrusion process.

The mill process reportedly is so exact that the length of a 30-ft. joint doesn't vary more than a fraction of an inch.

The drillpipe was fitted by Reed Roller Bit Co. with its 4½-in. internal flush "Super Shrink Grip" tool joints, modified slightly at the pipe end connection to fit the aluminum pipe. This is a hand-applied connection of the shrunk-on type.

Shell reportedly is using, or will use, the string on a well in the Texas Gulf Coast area.

continued ▸

For those with tough mud standards

Baroid's new concept of marketing is unique among mud companies in the degree to which Baroid meets your most exacting standards. Are you concerned with quality of product? With accurate delivery? With modern facilities? With ready availability? With skilled engineering? Baroid's marketing concept achieves these standards efficiently by a single integrated operation.

No other mud company matches the extent to which Baroid accepts the responsibility for every step in the mud process from mines, plants and laboratories to your well. Companies in every key industry are maintaining their leadership by integrating and streamlining. The oil industry follows this concept in serving the public, by maintaining quality of product and service through unified control. Baroid is the first to apply this to the mud industry.

This commonsense approach to mud marketing *saves your drilling dollars.* Your planning, purchasing and accounting operations are simplified. Whatever your mud problem, whatever your mud standards, Baroid has the answer.

BAROID

BAROID DIVISION NATIONAL LEAD COMPANY

MAIN OFFICE: P. O. BOX 1675, HOUSTON 1, TEXAS

6048

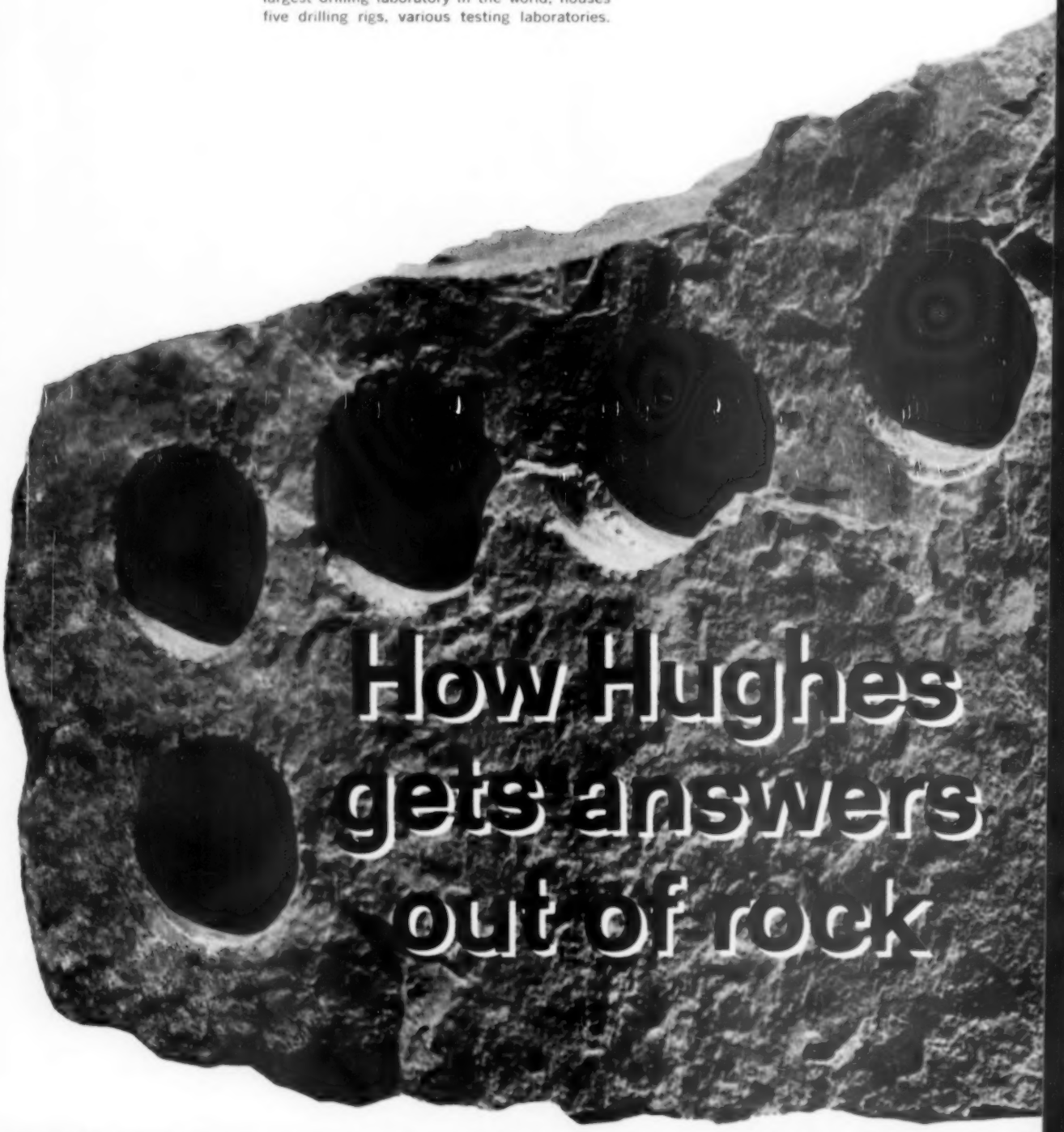
Hughes drilling laboratory is speeding product development

Hughes Research and Engineering Laboratory, largest drilling laboratory in the world, houses five drilling rigs, various testing laboratories.

Thousands of blocks of rock have been drilled in the Hughes Research Laboratory in testing new bit designs and materials, and in studying new drilling techniques.

Many of these blocks are as big as the five-ton block of pink quartzite, pictured below, and some as small as your hand.

The big blocks duplicate, as far as possible, the types of formations in which the bits being tested will be used. The small blocks are used in microbit drilling. The latter is valuable in studying the effect of mud column pressure on the drillability of formations and in estimating bit performance.



How Hughes gets answers out of rock

We even drill on heat-treated alloy steel blocks, in measuring bearing wear under various loads and rotating speeds. Hard, high-strength, abrasive rock is also used in evaluating individual tooth designs and materials, such as alloy steels and hardfacing.

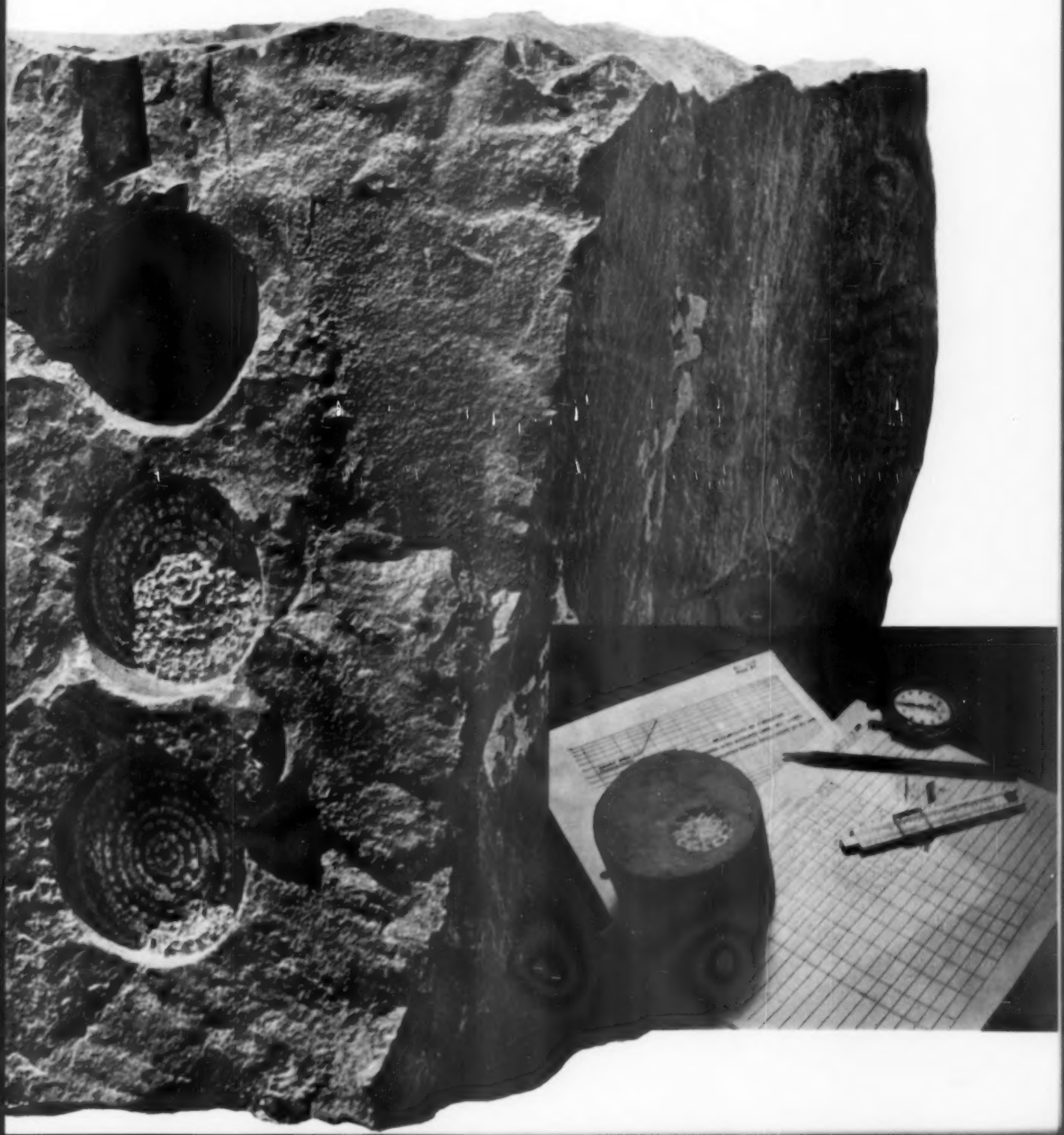
Laboratory drilling enables us to use closely controlled equipment and to repeat any test as often as necessary to get a complete performance picture. In addition to facts about products and materials, we can get a wide range of information about operating procedures.

Hughes laboratory drilling research serves as the intermediate step between conception of new bit designs and their testing in the field. It also materially shortens the time between the design stage and delivery of *performance-proved* bits to your rig.

To date, Hughes research, carried on continuously for a half century, has been responsible for every major advance in cone-type rock bits.

HUGHES

ORIGINATOR AND WORLD'S LEADING DEVELOPER OF CONE-TYPE ROCK BITS



a christmas tree is only as strong as its weakest seal

Rector makes the hook-up that is Sealed with Steel throughout

Rector wellhead equipment is designed to insure a leak-proof seal at all connections. Compare Rector's metal-to-metal seal features with any equipment on the market using resilient packing between casing and tubing strings. The Rector principle of reinforcing temporary organic packing with a permanent ring of steel insures a positive leak-proof completion every time. Rector's built-in welding ring coupled with an API ring gasket is easy to install, immune to corrosion inhibitors, will not flow under high pressure or temperature, will not freeze or contract under low temperature, will not burn out, and never requires maintenance or replacement.

There are no weak links in your completions, when you specify Rector equipment at your favorite supply store, or from your Rector representative.

30 YEARS MAKING THE OIL INDUSTRY SAFER

Rector

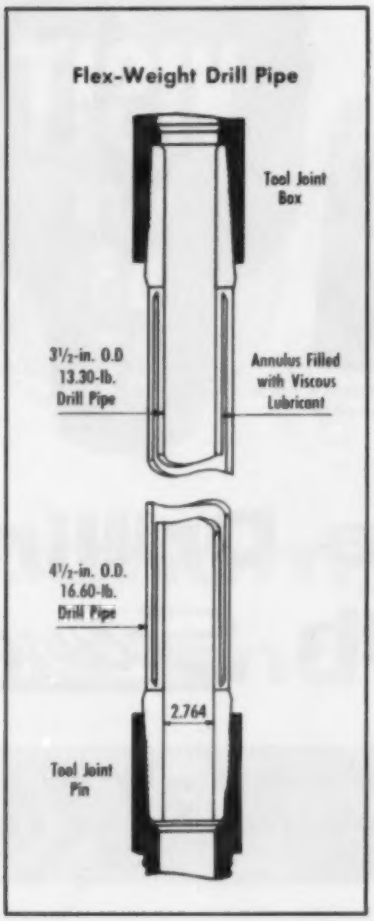
Well Equipment Co., Inc.

Making the Oil Industry Safer!

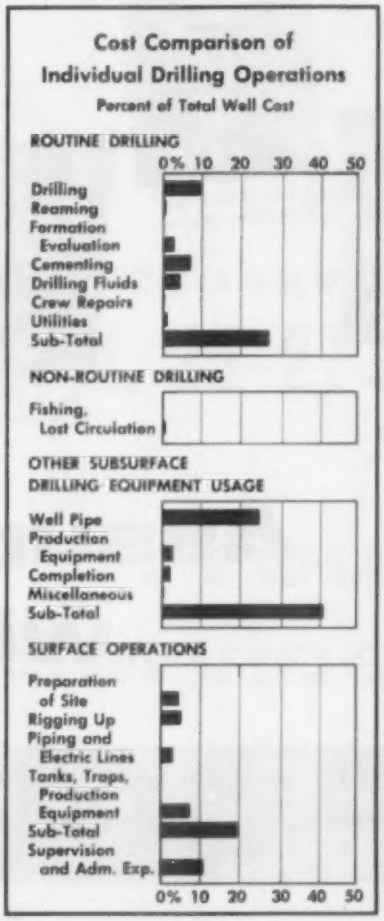
1100 North Commerce, Fort Worth, Texas Houston Plant: 2215 Commerce Street

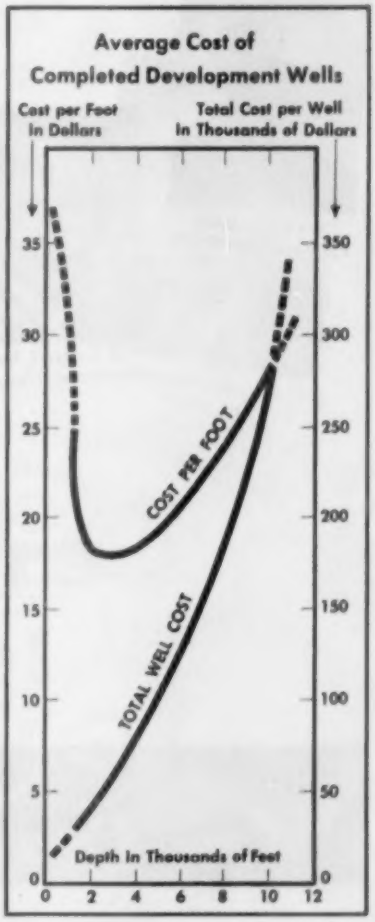
EXPORT REPRESENTATIVES: Continental-Emsco Co., Mid-Continent Supply Co., Oilwell Division of United States Steel Corporation

MONOGRAMMED EQUIPMENT CERTIFICATE NO. 2158



SCHEMATIC of Flex-Weight drillpipe shows concentric pipe arrangement.




Average Cost of Completed Development Wells
Cost per Foot In Dollars
Total Cost per Well In Thousands of Dollars
COST PER FOOT
TOTAL WELL COST
Depth In Thousands of Feet
0 2 4 6 8 10 12
0 5 10 15 20 25 30 35
0 50 100 150 200 250 300 350

COST TABLES based on some 500 holes, averaging about 3,500 ft., over the past five years, help Standard Oil Co. of California in planning drilling programs.

High-Strength Pipe's Use Up

Another significant development is the bringing of high-strength drillpipe to the commercially feasible stage for very deep drilling. The need has been pressing, the obstacles formidable.

High-strength pipe for drilling usually is considered to be that of 80,000-lb. minimum yield strength or greater.

Drill strings ranging up to 105,000-lb. minimum yield are in fairly common usage, and at least one string of 135,000-lb. strength reportedly is in use.

But these strings have been used, for the most part, in relatively shallow holes. There has been a considerable amount of hesitancy in using them for very deep drilling.

The problem of retaining ductility in the higher-strength grades, the hazards of downhole abrasion, and the effects of slip damage and just plain careless handling all have presented serious handicaps to general usage.

Damage that probably would cause only minimal effects in shallow drilling can be critical at extreme depths. A pinhole leak causing pipe failure can be an expensive proposition indeed below 15,000 ft.

At the same time, the tremendous hook-load requirements of very deep drilling have bolstered demands for pipe and an ever-higher yield strength. Until recently, virtually all of the developments along this line—including field application—were experimental. Now the movement is shifting into the commercial stage.

One of the big reasons for the recent advantage in this area is demonstrated success in flash-welding tool joints to the high-strength pipe.

Flash welding has become an industry standard because of its low cost. But, because various metallurgical alterations are produced within the comparatively narrow zone affected by the welding operation—principally softening or loss of strength—pipe manufacturers had viewed this technique with considerable reservation.

There is no question now, however, that this problem has been licked.

Hughes Tool Co. began performing the service on a commercial basis within the past few months.

Hughes began developing its "Flash-Weld" technique back in the middle '30s, and by the late '30s, had brought the service to a fully operational status.

Around 1953, the need for higher-strength pipe became

continued ▸

KEN BYERLY, Dallas
Vice President, Domestic Sales

M. L. TALBERT, Dallas
Vice President, Engineering

JOHN ORTON, Dallas
Vice President, Export Sales

RALPH HUGHES, Dallas
Vice President, Manufacturing

Assure Drilling with *Security*

Meet these men, responsible to You, the This management is supported by an eager,

LEONARD BUSBY, Dallas
Regional Manager

FRED DALLAS, New Orleans
Special Representative

JIM DIRKS, Lafayette
Division Manager

CHESTER FRAZIER, Oklahoma City
Division Manager

DICK KING, Dallas
Sales Administrator

FRANK LEONIS, Long Beach
Regional Manager

JOE McGRAW, Denver
Division Manager

RUDY RENDALL, Shreveport
Division Manager

CLARENCE STRAIT, Houston
Special Representative

AMERICAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS

AACDC

NEW ORLEANS

Hotel Roosevelt

..... Sept. 25-27 .....

JOHN NELIES, Dallas
President

Economy . . . Yours
Bits and Service!

customer for assured quality, economy and service.
topflight team of field representatives.

BILL GALLMAN, Tulsa
Special Representative

DUB GRAY, Houston
Division Manager

MACK HARLAN, Carmi
Division Manager

JIM KELLY, Edmonton
Division Manager

BILL THOMAS, Dallas
Special Representative

MUTT WALKER, Odessa
Division Manager

Get SECURITY in Your Drilling!

Security

DRESSER INDUSTRIES INC.

OIL • GAS
CHEMICAL
ELECTRONIC
INDUSTRIAL

PLANTS . . . Dallas, Texas; Whittier, California; Manchester, England
SECURITY ENGINEERING DIVISION . . . 3400 W. Illinois, Dallas, Texas
EXPORT OFFICE . . . Post Office Box 13647, Dallas, Texas
CANADA . . . Security Engineering Canada, Ltd., Edmonton, Alberta, Canada
OVERSEAS . . . Security International C. A., Caracas, Venezuela; London, England

apparent, and Hughes started development of its "normalizing" equipment to meet the problem of flash-welding joints to the new grades.

(Strictly speaking, "normalizing" means bringing steel above the critical temperature range, then air-cooling it naturally. The Hughes method departs from this to some extent because the rate of cooling is accelerated by conduction of heat through the pipe away from the tool joint.)

Presently, Hughes is able to flash-weld successfully on any high-strength pipe now in use, and is prepared to meet expected conditions in even higher-strength pipe.

Actually, the welding operation, alone, isn't greatly different with high-strength than with low-strength drill-pipe. Hughes uses its "magic ring" induction-coil method for both.

However, the company has introduced several control manipulations requiring specialized equipment in flash-welding the high strength type.

The process creates a fine-grain structure in and around the weld, and is described, therefore, as a type of "grain refining treatment." The joint then goes through a second coil, which is essentially a stress-relieving operation.

The key to success in flash-welding tool joints to high-strength pipe by this method is simply that the thickness of the upset section more than offsets the softening of the pipe in the narrow area adjacent to the actual weld.

Reed Roller Bit Co.'s "Flash Welded" method of affixing tool joints to high-strength pipe has been a fully commercial process for some time. The procedure basically is the same as for the lower-strength pipe, but certain additional steps are necessary.

The pipe and the tool joint both are preheated to a given temperature, then flashed with a standard resistance type of weld and put through a cooling cycle, controlled both as to time and temperature.

High-strength pipe then is put into a normalizing process, and again through a time- and temperature-controlled cooling step.

The machining stage, where both inside and outside discontinuities are removed, is more critical with high-strength pipe and is given particular attention.

All Reed Flash Welded joints are inspected inside and outside visually, and magnafluxed.

Currently, Reed also is using ultrasonic inspection methods, but this is primarily on an experimental basis.

Testing procedures are varied and extensive, and have demonstrated the complete feasibility of the commercial application.

Reed uses a rotating fatigue-testing machine, which was designed particularly to test welded connections.

The machine is so constructed that it can test, simultaneously, tensile loading, bending loading, and torsional loading on a joint of pipe.

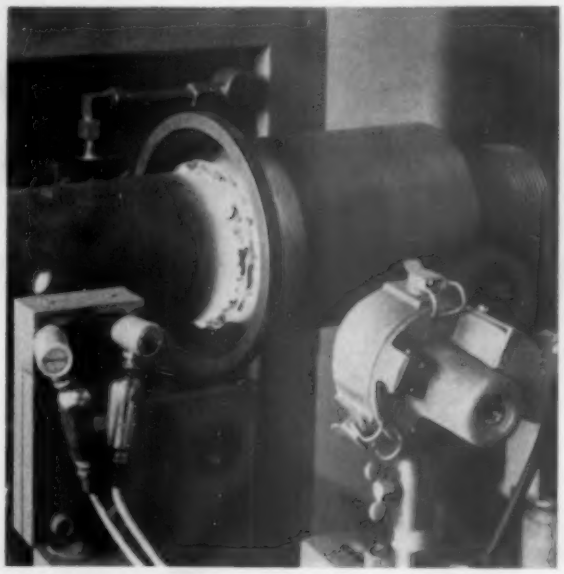
On another machine, Reed conducts tensile impact tests to make sure the weld area isn't subject to breaking. The machine develops loads up to 130,000 ft.-lb. Welds also are subjected to microstructural examinations and hardness tests.

"We've never had a failure in the weld zone of Flash Welded pipe," says a Reed official.

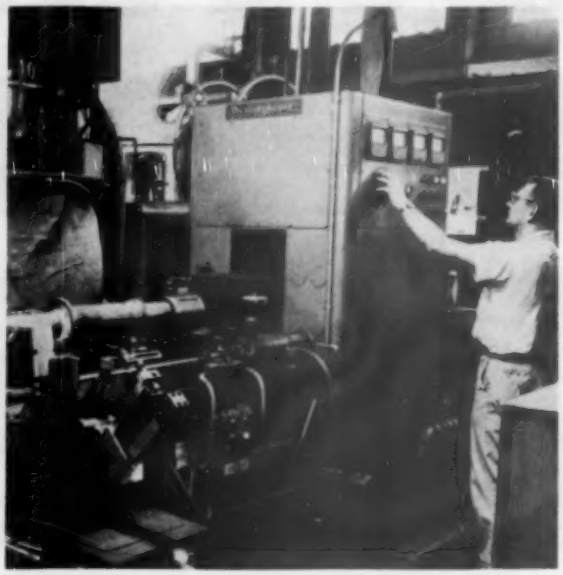
Another firm pushing the technique is American Iron and Machine Co. It uses a post-flash heat treatment on all pipe it flash-welds.

The Oklahoma City firm has applied the technique to various grades of pipe, ranging up to 135,000-lb. minimum yield, on samples submitted by individual steel mills. In laboratory analysis, the finished product met specifications set by both American Iron and the steel mills.

And the company has flash-welded, commercially, several strings of 105,000-lb. minimum yield pipe.



NORMALIZING process is applied to this flash-welded high-strength pipe and tool joint in Reed Roller Bit Co. shop.



OVER-ALL VIEW of normalizing equipment used by Hughes Tool Co. for Flash-Weld operations. Power source is at right.

The elevation of flash-welding to the commercially useful point—in fact, the successful development of high-strength pipe itself—has been due primarily to cooperation between pipe manufacturers and oilfield supply and service firms.

continued ▸

Wherever air drilling solves the problem ... Gardner-Denver has the answer

- Air drilling
- Aerated mud
- Muddiated air
- Mist drilling
- Gas drilling
- Restoring lost circulation

THERE'S NO SUBSTITUTE FOR MEN

100 years of customer confidence. Side by side with "roughnecks," the Gardner-Denver man finds himself out on lonely offshore barges or in oil fields scattered throughout the world—always keeping a careful eye on his equipment's performance.

A background of experience in developing compressors and devising techniques for every phase of air drilling provides Gardner-Denver specialists with a fund of knowledge that's at your service wherever compressed air may solve a drilling problem for you.

Alaska, Canada, United States, Mexico, Australia . . . Guatemala, Honduras, the Bahamas . . . Turkey, Libya, Algeria, Saudi Arabia. Wherever air drilling has been put to work, Gardner-Denver specialists have worked side by side with drilling crews.

In scorching desert temperatures of 135° . . . at 55° below in the Arctic . . . at sea level . . . or at altitudes of 10,000 feet, Gardner-Denver equipment has passed the toughest test of all—field experience.

Specify Gardner-Denver compressors with confidence for air drilling any size hole to any depth, with seismograph rigs or with the largest of land-based or offshore rigs.

Consult your Gardner-Denver air drilling specialist—or write for further information.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario
Gardner-Denver Export Division, 233 Broadway, New York 7, N. Y.
Oil Field Offices: Casper, Cleveland, Columbus, Corpus Christi, Dallas, Denver, Durango, Edmonton, Ellinwood, Evansville, Houston, Huntington, Jackson, Kansas City, Lafayette, Los Angeles, Mexico City, New Orleans, Odessa, Oklahoma City, Pittsburgh, San Francisco, Shreveport, St. Louis, Tulsa, Wichita, Winnipeg

the world's fastest:

Servco Pilot Mill mills up 202 feet of 7-inch, 29-lb., N80 washpipe in just 19 hours!

longest:

Servco Pilot Mill mills up 1138 feet of 9-5/8 inch, 53.5-lb., N80 and P-110 casing, at 4 ft./hr.!

deepest:

Servco Junk Mill chews up cementing plug, float collar and shoe, plus 210 feet of cement, at 21,688 feet!

milling job!

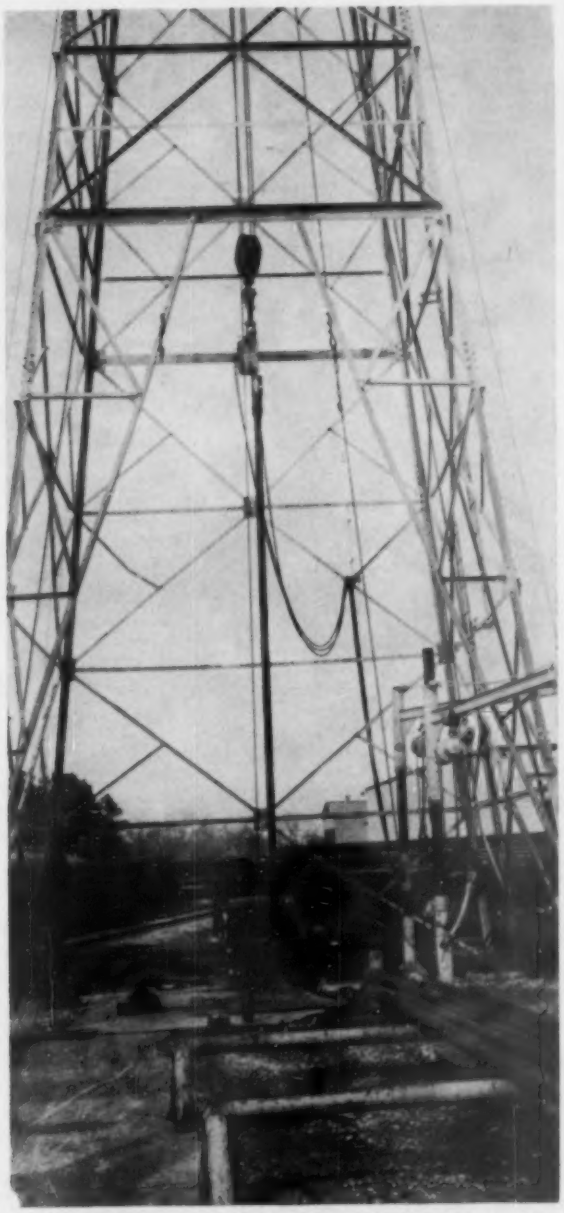
All three records were set with SERVCOLOY-DRESSED milling tools!

Whatever your milling problem—stuck washpipe, drill pipe, tubing, or packers... lost rock bit cones and other loose junk on bottom... liner removal... collapsed casing... section milling for sidetracking... swaged casing completions—Servco milling tools can save you money. Their phenomenally-fast cutting action has revolutionized downhole fishing methods and well recompletion work. Your Servco representative will be happy to give you actual job records and show you how others have profited from the use of these modern milling tools. Call or write him today.

PILOT MILL JUNK MILL

SERVCO ...*the modern drilling tools*

General Offices: 2440 Cerritos Avenue, Long Beach 6, California
Canada: 6909 104th Street, Edmonton, Alberta
Venezuela: Maracaibo
France: 106 rue Lauriston, Paris 16
Trinidad: San Fernando
Field Offices: Ventura, Bakersfield, Lafayette, Harvey, Casper, Oklahoma City, Houston, Odessa, Williston



TENSION-IMPACT drop testing rig is used by Hughes Tool Co. to test high-strength drillpipe. The unit can apply an impact of over 400,000 lb. to a heavily-weighted drillstem.

The chemical composition of the pipe is all-important, having a much greater effect on successful drilling than the hardness or thickness of the pipe.

If the pipe, for instance, were of the "wrong" chemical composition, flash-welding could implant points of "leakage," later causing washouts or even complete pipe failure.

In a continuous program of development—which hasn't stopped yet, by any means—the manufacturers customarily make available to the oilfield materials firms samples of newly evolved types of pipe.

These samples are subjected to welding, testing, and evaluation, and the results are reported to the manufacturer.

"We operate in terms of probabilities," explains the chief metallurgist for one oilfield materials firm. "Particularly where operating conditions are severe (during drilling), probability becomes more and more important."

Sometimes, certain experimental lots of high-strength drillpipe are found to be not entirely satisfactory for welding. There would be too much of a hazard and a gamble involved for the oil operator or drilling contractor. When this is reported to the mill, the manufacturer usually revises his experimental approach.

As part of its testing work, for example, Hughes uses a tension impact (drop) testing rig capable of applying an impact of more than 400,000 ft.-lb. to a heavily weighted drillstem.

The rig was built because the higher chemical content of high-strength drillpipe during the late '50s became an additional problem to flashwelding.

"We wanted, literally, to yank the pipe apart," said a company official. "From the rig we've received information through the years about what the weld would stand as each new type of pipe was developed."

Developments involving pipe are continuing. Some of the mills reportedly are looking at the possibilities of drillpipe with 160,000-lb. minimum yield strength. Others evidently are banking on oilfield usage of specialized pipe with lower strength requirements.

Some of the mills believe future deep drilling will depend less on high strength, as such, and more on specialized use of pipe, such as the application of tapered strings.

One approach is the "Dual Weight" drill pipe being turned out by Pittsburgh Steel Co. (PW-Jun.24'60,p46). The pipe has 4 ft. to 6 ft. of heavier wall thicknes at the box end of the pipe, tapering into a lighter-weight body.

Such combining of the advantages of both light and heavy weight is designed to reduce the per-foot weight of the drill string and still give extra strength at the point that must bear the contact with slips.

Still other mills evidently believe that the answer will lie in increasing wall thickness of drill pipe, rather than changing its chemical composition.

One of the more novel approaches is a specially designed, concentric drill pipe with a viscous lubricant filling the annular space.

The pipe is manufactured by Flexweight, Inc., Great Bend, Kan. It was introduced in eastern Kansas about three years ago. More than 80 strings are being run now by contractors in Kansas, Michigan, Wyoming, Illinois, Oklahoma, and the Texas Panhandle.

Idea behind the development: to achieve the type of built-in weight-per-foot value attained with drill collars, but to retain flexibility approximately equal to that of standard drill pipe.

The 3½-in. OD, 13.3-lb.per-ft. inner pipe is surrounded by a joint of 4½-in. OD, 16.6-lb.-per-ft. outer pipe, with the annulus between the two filled with a viscous lubricant that serves both as a vibration dampener and a corrosion inhibitor. Unless there is a twist-off, the fluid remains intact throughout the life of the pipe.

The joint is prestressed during manufacture, with opposing forces approximating 15,000 psi. induced in the concentric pipes to reduce the chance of permanent bending in field use.

continued ▶

NORTH, SOUTH, EAST AND WEST—

OPERATORS GET FAST PAYOUTS, GOOD PROFITS

You increase net profits when you perform successful workovers on your wells. Dowell services, products and engineering aids are designed to help you get those added profits. Here are results from a few of many recent jobs.

OPERATOR NETS $4715 IN 90 DAYS FROM ABRASIJET AND ACIDIZING BY DOWELL

ALBERTA, CANADA. Three old wells in the Redwater pool produced an *extra* 4520 barrels of oil in 90 days as a result of Abrasijet*—Dowell's abrasive jetting service—and Dowell acidizing treatments. After deducting total workover and treatment costs from added revenue of $10,115, a net profit of $4715 was realized.

DOWELL SAVES GAS WELL– GETS 10-DAY PAYOUT

SOUTH TEXAS. A Dowell frac job made a 2,750 mcfd producer out of an old Frio well that was practically dead and non-commercial. Payout on treatment was estimated at 10 days.

DOWELL FRAC JOB BRINGS NEW LIFE TO 40-YEAR-OLD GAS WELL

WEST VIRGINIA. 850 mcfd open flow and 200 mcfd delivered into line resulted when Dowell fractured a practically dead 40-year-old gas well. Treatment cost was paid out in less than 30 days.

TREATMENTS WITH VERSENE 100 GIVE 35-DAY PAYOUTS IN PERMIAN BASIN

WEST TEXAS. Average payout of ten treatments by Dowell using Versene® 100 was 35 days. Versene 100 is a chemical used to remove calcium sulfate, calcium carbonate and other scales from wells. Average production increase was 9.7 bopd and treatment costs were between $550 and $875. Net value of oil was assumed to be $2.00 per barrel.

WITH DOWELL WORKOVER TREATMENTS

DOWELL USES "ACID GUIDE"* TO GET FAST PAYOUT ON THREE PROBLEM WELLS

NORTH DAKOTA. Payouts of 55, 23 and 65 days were realized from treatments with Retarded Acid of three old wells in the Madison lime of McKenzie County. Previous treatments using regular acid in the same field had failed to pay out.

NEW ACID TREATMENT SAVES OPERATOR ABOUT $400 PER MONTH ON WATER DISPOSAL WELL

SOUTHEASTERN NEW MEXICO. A single $735 treatment replaced three $650 monthly treatments on a Lea County disposal well. By substituting Stabilized Acid and a surfactant wash for regular acid, life of the job was tripled at an extra cost of only $85. Savings averaged about $400 per month.

FRAC JOB PROVIDES EXTRA GAS AT THREE CENTS PER THOUSAND

NORTH LOUISIANA. 105 mmcf of *extra* gas was produced in four years from a well in the Monroe Gas Field. Reason for this extra production was a Dowell frac job performed in March, 1956. Based on treatment price, the extra gas cost the operator three cents per thousand. 39 similar wells fractured early this year promise to be at least as profitable as the 1956 job.

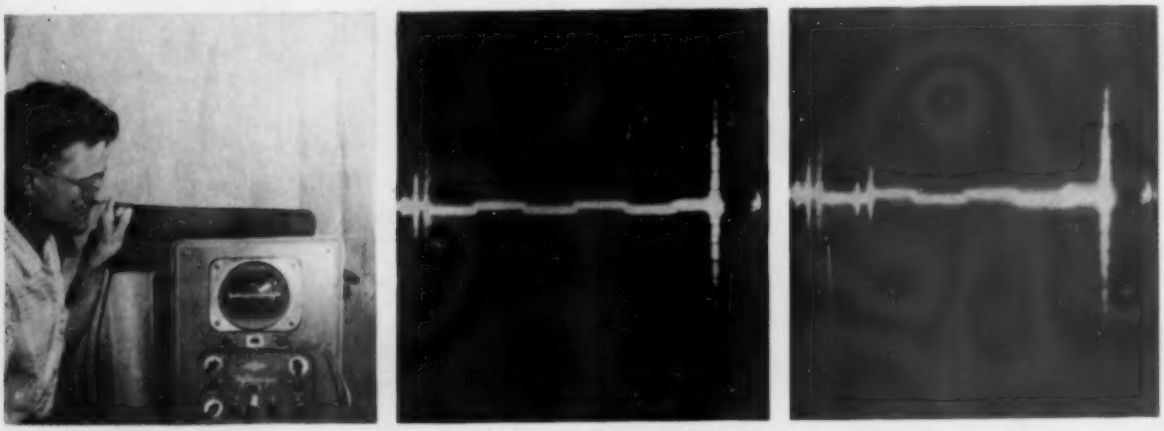
Talk over your workover problems with your Dowell representative. He will show you how Dowell can use new ideas and techniques to help you cut costs and increase revenue. Dowell services and products are offered from more than 150 offices and stations in the United States, Canada, Venezuela, Argentina and Germany. Dowell, Tulsa 1, Oklahoma.

* Dowell Trademark

Services for the oil industry

DOWELL

DIVISION OF THE DOW CHEMICAL COMPANY



ULTRASONIC TESTING is growing in importance in testing of pipe. Here a Sperry Reflectoscope (left) is shown testing a 21-in. bolt. No flaws show on screen (center) but a saw-cut, 1/16 in. deep, simulating a crack, shows up as a pip on screen (right).

Field reports have been generally favorable. Contractors, however, seem to be reserving judgment on the economics, noting that, while the pipe costs less than drill collars, the life expectancy may not be as long.

There are some drawbacks. For one thing, the inside diameter of the inner pipe is 2.764 in., restricting the orifice through which the drilling fluid must circulate. This results in poor hydraulics and makes jet bit drilling more difficult.

Although it doesn't carry as high a priority as drillpipe, high-strength casing also is receiving its share of developmental work.

Casing now is commercially available in strengths up to 110,000-lb. minimum yield strength, and there is at least one string of 150,000-lb. minimum yield casing in the ground (in the Richardson & Bass, et al, deep well in southern Louisiana.)

But the mills are prepared to offer much higher-strength casing than is now commercially available when the demand arises.

"We have made experimental runs of 150,000-lb. minimum yield casing and can start producing it any time," one mill official told PETROLEUM WEEK. "There just doesn't seem to be anyone interested in it."

Certainly classed in the "blue sky" department at the moment are such possibilities as electronic welding of tool joints to pipe. But it is being considered, along with possible methods of reducing the size, yet retaining the strength, of tool joints.

Electronic welding is a reality today in the realm of missile and rocket manufacture and fabrication. Its chief values are the speed of operation and the fact that the weld affects a much smaller area of the adjacent metal.

Both advantages would make the technique immensely valuable for tool-joint welding on high-strength drillpipe.

The principal reason it isn't being used is economics. The method requires the use of a vacuum chamber, a component that would be extremely expensive for the size necessary to accommodate a joint of drillpipe.

One of the more promising research items, meanwhile, seems to be in the direction of trimming down the size of the tool joints, yet leaving them just as strong. This will probably require use of previously unknown metallurgical combinations.

Pipe Inspection Improves

The exigencies of today's drilling make it more imperative than ever that no imperfect pipe go down the hole. Yet studies have shown that a substantial percentage of pipe reaching the field is defective.

Tuboscope Co. inspected 9,982 joints of new drillpipe between May 1, 1959, and Apr. 30, 1960, and rejected 515 of the joints—5.2% of them—for defects.

This pipe ranged from 2⅜ in. in diameter to 5 in., and from Grade D up to high-strength drillpipe with minimum yield strengths of 90,000 to 95,000 psi.

(During the same period, Tuboscope inspected 197,912 joints of new tubing of various types and sizes, rejecting 15,070 joints, or 7.6%; and checked 156,580 joints of new casing, rejecting 4,014 joints, or 2.6%.)

The types of defects are numerous—wrinkles, seams, pits, cracks, etc. All are capable of causing pipe failure downhole.

The growing importance of defect-free pipe to drilling operations has brought into the field many inspection techniques, which are being used on a broadening scale by the industry.

Tuboscope's magnetic flux, visual scope, and Amalog procedures have been in both plant and field operation for some time.

Magnaflux Corp.'s Magnaglo method of pipe inspection involves application to the pipe of magnetic powder, containing fluorescent particles, to show up surface and near-surface defects under ultraviolet light.

The testing of pipe by means of the eddy-current method is quick. Several kinds of instruments have been developed for this type of test, including those of Magnetic Analysis Corp., Metrol Inc., and the Farrowtest apparatus of Republic Steel Corp.

The ultrasonic testing indicates, according to the method applied, the location of longitudinal or transverse defects —no matter where they are.

The ultrasonic inspection method of International Inspection, Inc., (Triple-Eye) is another that is now in operational use (PW—Aug.19'60,p65; Jul. 22'60,p25).

Another is the magnetic flux logging technique developed by Induflux, Inc., Los Angeles.

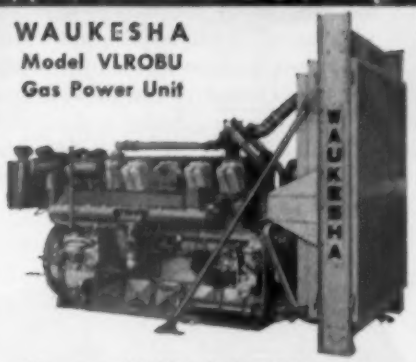
continued ▸

three WAUKESHAS power

B. L. McFarland Drilling Co., of Midland, Texas, first to drill with new "1500" Gardner-Denver rig.

With its drawworks rated 1500 input hp, this new Gardner-Denver "1500" rig is fast, economical and efficient for drilling to 20,000-ft. with 4½-in. O.D. drill pipe. A total of 8 forward and 2 reverse speeds to the drum; 4 forward and 2 reverse speeds to the rotary table can be obtained. Compounds and drive arrangements for this drawworks are limited only by customer requirements. The McFarland rig shown includes a 142-ft. 1-million lb. capacity drilling mast, one Gardner-Denver RT-27½ rotary table, and two Gardner-Denver GR-GXR mud pumps. Powering the rig are three Waukesha Model VLROBU Waukesha Gas Power Units with tremendously powerful, rugged 12-cylinder 5788 cu. in. engines, each developing 700 continuous duty hp, well known for their long-life dependability and economy in oil field service.

WAUKESHA
Model VLROBU
Gas Power Unit



Big powerful 12-cylinder high compression, overhead valve, 60-degree vee, four-cycle engine of 8½-in. bore and stroke, 5788 cu. in. displacement. Connecting rods are paired; opposing pistons operating from a single wide area 5¾-in. dia. crankpin; 7-bearing 6¼-in. dia. crankshaft. Send for Bulletin 1656.

Waukesha Engines and Power Units to 1235 hp. Turbocharged and Normal Diesels, Natural Gas, LPG. Get Bulletin 1079.

491

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN / **New York • Tulsa • Los Angeles**
Factories: Waukesha, Wisconsin and Clinton, Iowa

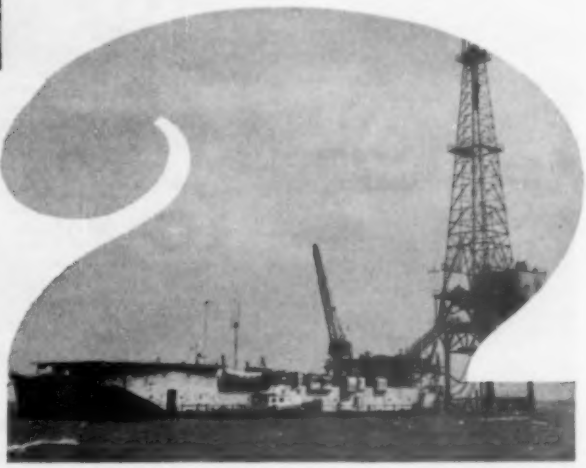
"SIX WAYS TO DRILL OFFSHORE"

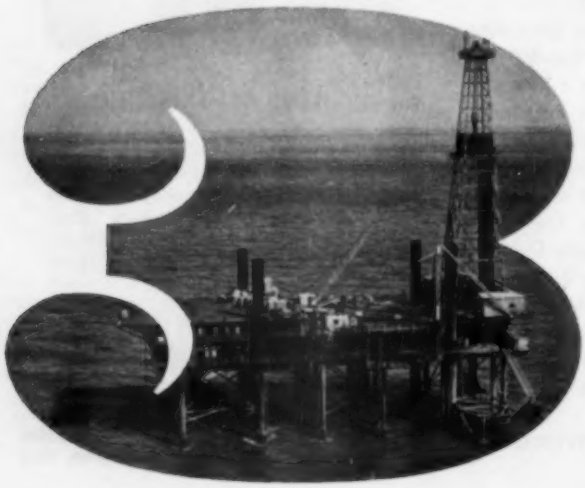
SELF-ELEVATING MOBILE PLATFORM

The most versatile tool for offshore drilling, it operates efficiently in water 15 to 110 feet deep, depending on soil conditions. Ideal for wildcats, field extensions, and widely spaced development wells, this type has repeatedly proved successful over a six-year period in greatly varied bottom conditions, water, and weather conditions off the coasts of the U. S., Panama, and Trinidad, and in the Persian Gulf.

TENDER AND PLATFORM

As the second oldest method of offshore drilling, the Tender and Platform now has begun to regain its well-deserved popularity. It will become more and more prevalent in deep-water operations. The Offshore Company can provide this type of tool, including design and construction of a dependable, minimum size platform if requested, for use in water depths up to 200 feet.





SUBMERGIBLE MOBILE PLATFORM

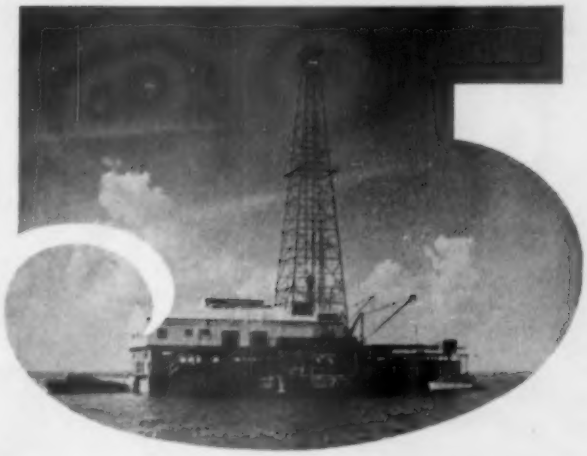
For water depths from 15 to 40 feet, this is a rugged, economical tool for wildcats, field extensions, and widely spaced development wells. The Offshore Company's submergible is equipped with four 6-foot diameter caissons, each with a pneumatic jack to serve as spuds and prevent movement in rough seas. This added safety factor can mean the difference between success and failure in many situations.

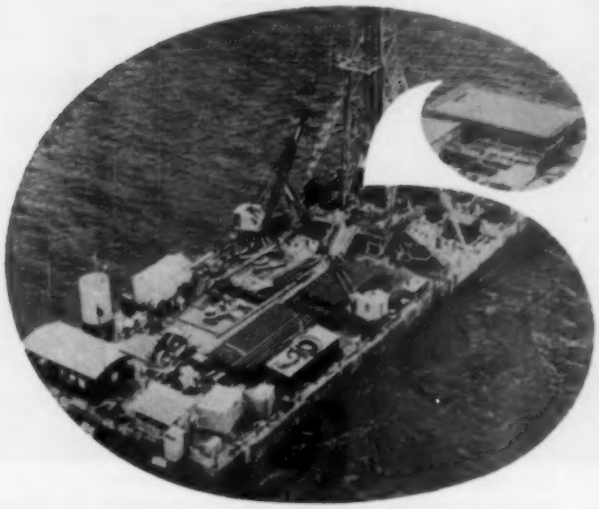
SELF-CONTAINED PLATFORM

Oldest of offshore drilling methods, the Self-Contained Platform is still the best for some development drilling and special exploratory situations. Offshore's platform rigs have a unitized design that can be handled by a derrick barge in just six lifts, and require the minimum size self-contained platform. Such platforms are the result of Offshore's years of experience in developing and choosing the right tool for the job.

SHALLOW WATER UNIT

For bays, sounds, and protected waters 10 to 18 feet deep, this type of unit is the most economical tool available. It is also suitable for semi-protected offshore waters up to 14 feet in depth. With steadily rising costs confronting the oil industry in so many operations, the varied, completely adequate Offshore Company units afford major savings time and again.





FLOATING UNIT

A recent development in marine drilling operations, this type of unit is useful for exploratory purposes in deep water. Its practical use, at present, is limited to obtaining stratigraphic and subsurface information. This unit was successfully used by Offshore on a major discovery below 10,000 feet in 100 feet of water.

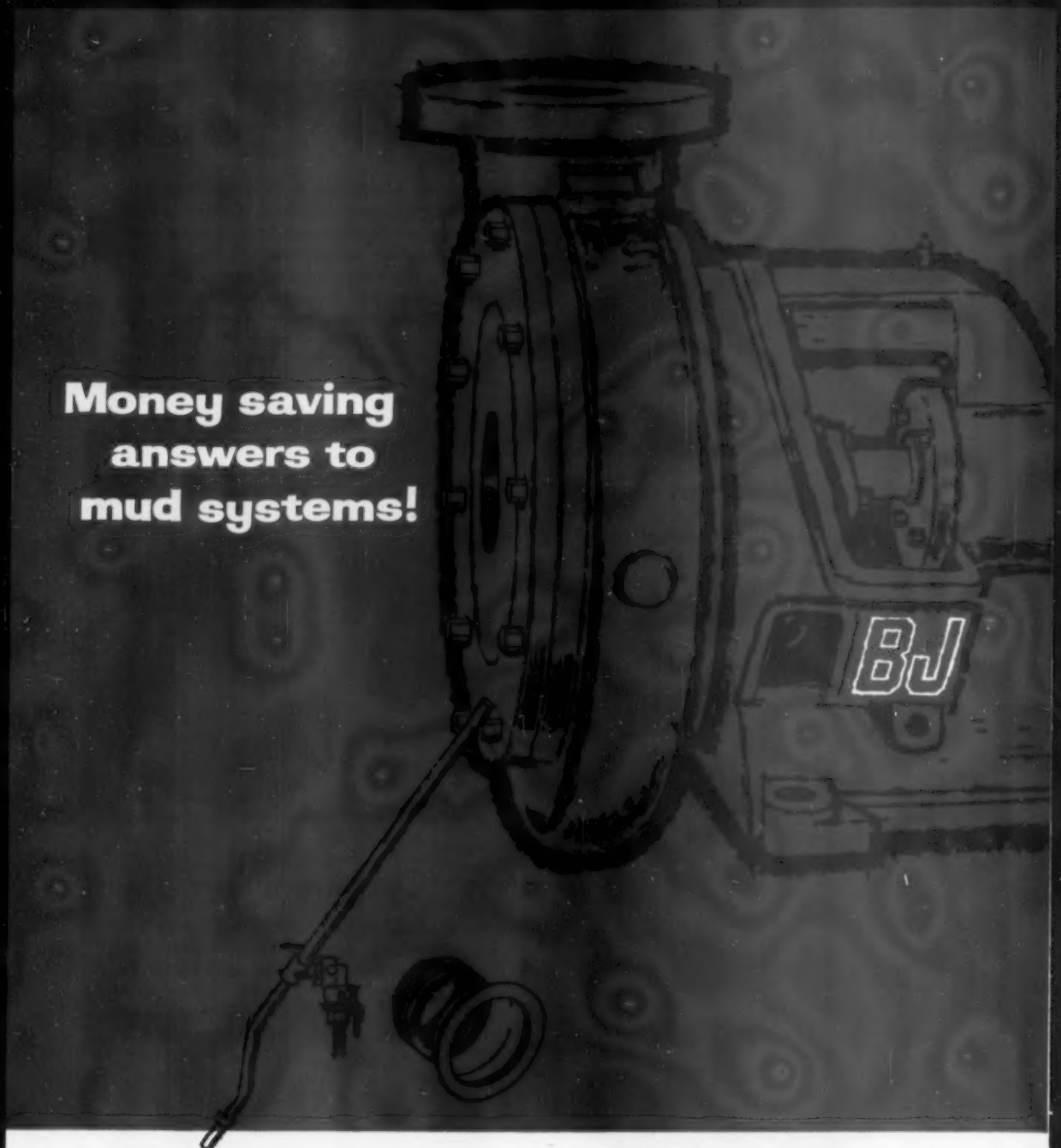
THE BEST IN OFFSHORE DRILLING CONTRACT SERVICE, DOMESTIC OR FOREIGN

Our versatile drilling units plus the skill of an experienced staff provide Offshore customers the best combination for efficient drilling operations... in water from 10 to 200 feet deep—world wide.

THE OFFSHORE COMPANY

BATON ROUGE, LOUISIANA

Box 1268 • Dickens 4-6703 • Cable Address: OFFSHORE



Money saving answers to mud systems!

Pumps, Tank Connectors, Mud Guns. Save money, save time, increase operating efficiency with mud system products engineered by Byron Jackson. Cut mud processing costs to the bone by using BJ Centrifugal Pumps to replace or supplement expensive reciprocating pumps. Total savings may run as high as 90%! For mud tank and slush pump hook-ups, you'll save with BJ Flex-Line and Flex-O Connectors. Flexible, versatile and easily installed, they provide a positive, leakproof seal . . . compensate for angular misalignments of up to 10°. And for more efficient mud mixing BJ offers ball-swivel and bottom type mud guns that give long, trouble-free service in all mud programs.

Send for bulletin (No. BJT-60-148), which gives details on reducing mud processing costs with BJ Centrifugal Pumps.

Byron Jackson Tools, Inc.
A SUBSIDIARY OF BORG-WARNER CORPORATION

P.O. Box 2017-A, Terminal Annex, Los Angeles 54 • P.O. Box 2198, Houston 1 • Export Address: 580 5th Ave., Suite 510, New York 36

BJ

RACKED PIPE is inspected by Induflux, Inc., crews using magnetic flux logging technique to locate any imperfections.

Induflux's equipment varies slightly, depending on the type of pipe to be inspected. For drillpipe, an internal magnetizing coil is passed through the pipe. An electronic analyzing device controls the current to the magnetizing coil and receives voltage readings from secondary pickup coils. The secondary voltages are processed within the analyzer and separated into components, which can be correlated with the physical properties of the steel.

The coils operate on a "focused flux" principle (with secondary coils placed inside the primary coils) to permit detailed scanning of the material. This is somewhat similar to the beam of electrons within a TV tube, where the source is some distance from the tube face, yet the beam is focused to a very narrow area on the face).

The technique produces a chart on which electrical resistance and magnetic properties are represented in curves, Not only does the process spot flaws, Induflux says, but it is possible, as well, to determine the degree of fatigue present in the metal.

With its growing awareness of the value of joint-by-joint inspection of pipe before use, the industry has been rudely awakened to the adverse economics involved in replacing defective lengths. This recently prompted Tuboscope, Inc., to establish an inspection station near Pittsburgh, in the heart of the steel mill country.

The idea is that inspection near the mill can tip the economic factors to a more favorable balance. It is no news to contractors and operators that, while a mill will replace a defective joint of pipe, the freight costs from the mill to the field and back come out of the customer's pocket.

Nor is it news that the customer isn't reimbursed for possible waiting time involved nor for the cost of threading (and perhaps upsetting) the pipe, nor for storage costs if the defects aren't spotted in time.

What is news is the fact that far more defective joints are being found now than before the advances in inspection techniques, multiplying the varied cost factors.

The cost of shipping pipe to the field varies, of course, according to the volume and the shipping point. But for a minimum 70,000-lb. shipment, the rate is 84¢ per 100 lb. (a 30-ft. joint of 4½-in. drillpipe runs about 16.6 lb. to the foot).

Barge shipment costs are somewhat less—about 65¢ per 100 lb.—but barging is so slow it isn't used extensively.

Although a defective joint may be turned in to the nearest supply outlet or affiliate of the manufacturer, the operator usually is out the cost of the shipment all the way from the mill to the location.

To make sure there will be sufficient defect-free pipe on hand, particularly when a critical well is involved, operators frequently order more pipe than is actually needed for the job. Usually, the rejects total between 2% and 15% of the total shipment.

Obviously, this has been a costly proposition—just from the standpoint of wasted transportation cost alone.

So Tuboscope recently opened its Pittsburgh inspection facility, containing its latest model Amalog unit (PW—Jul. 15'60,p59). It is capable of handling as many as 400 joints of tubing or 100 lengths of 9⅝-in. casing per day.

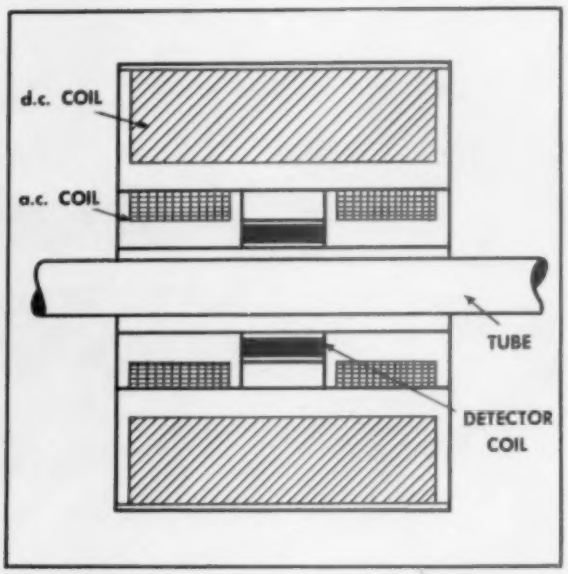
Instead of making the long rail journey to the oil patch, a shipment is sent to the inspection station, and any rejects are pulled out there. The mill is notified, so it can make its inspection on the spot. The double cost of shipment to the field and back is eliminated. And it sometimes is possible for pipe needing only minor correction to be sent back to the mill, fixed, and returned in time to rejoin the rest of the shipment.

Tuboscope says the technique has been carried to the point now where pipe no longer is "blue-tagged"—where there is doubt as to whether the pipe really contains an imperfection or not—but that all pipe is either tagged as up to API specifications or rejected.

The mills apparently are cooperating, and evidently are becoming convinced of the reliability of the inspection process.

continued ▸

AMALOG UNIT for electromagnetic inspection of pipe was just completed by Tuboscope Co. near Pittsburgh steel sources.



COIL ARRANGEMENT for electromagnetic tubing tests involves electronic evaluation of detector-coil assembly output.

Turnkey Drilling Grows

One of the most significant trends in drilling today is a definitely discernible leaning toward turnkey contracting. At this point, it is anyone's guess just how far it will go. But the possible ultimate impact could be great.

Turnkey drilling has been around for a long time. But it has been used sparingly, mostly on isolated programs. Though it's still a long way from becoming standard operating procedure, there are indications that the practice is gaining headway as an accepted method.

The bulk of turnkey drilling, so far, has been done for independent operators who lack adequate technical staffs. But some of the majors already are using it to some extent, and others are heading that way. Asked why, one major replied:

"Such an operation could result in streamlining activities for both the drilling contractor and the company, and could assist each to attain greater efficiency. Duplication of effort could be avoided, and certain cost savings enjoyed by both parties."

More than one source told PETROLEUM WEEK that "as many as 90% of the development wells probably will be drilled on a turnkey basis within the next few years."

Both prevailing types of contract drilling—day rate and footage—contain recognized drawbacks.

Day rate, in effect, is outright leasing of the contractor's rig and crew at so much per day. It presupposes a drilling program tightly supervised by the operator. Assuming that he is supplying his rig and personnel at a realistic rental, the contractor has a built-in guarantee of profit, and takes no risks.

The day-rate contract is relatively expensive for the operator. Operators feel, generally, that it doesn't contain sufficient direct incentive for the contractor to drill as efficiently as possible.

The footage contract, the most commonly used today (probably 90% of the wells are drilled under this type of arrangment), usually is based on a rather rigidly fixed drilling program, to which the contractor must adhere closely. The bid is based essentially on a per-foot price to total depth. Although he usually is protected against certain mishaps, such as lost circulation, the contractor is not guaranteed a profit.

Operators feel that the footage contract promotes maximum efficiency in drilling, since that is the only way the contractor can come out ahead. On the other hand, the contractor feels strongly today that footage contracting is pushing him against the wall unfairly. With competition at an all-time high, he is forced to bid so low that he is wearing out his equipment without hope of replacement.

But the footage contract contains another serious deficiency, which works to the detriment of both operator and contractor. Inevitably, under this type of agreement, there are areas of doubt regarding responsibility. Wrong decisions can run up expenses or even cause mishaps. Sometimes there are delays at critical times during drilling because neither the contractor nor the operator is anxious to call the turn.

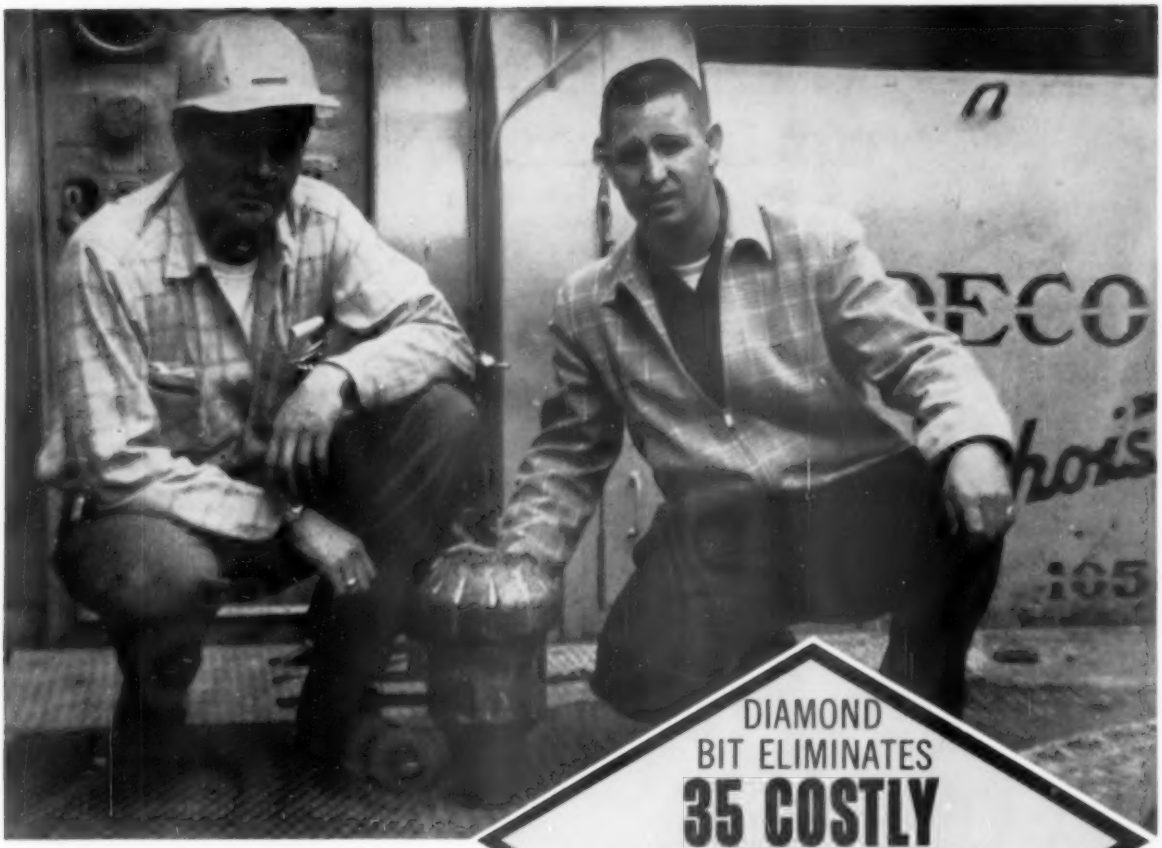
Turnkey drilling offers certain inherent advantages to both contractors and operators:

- The division of responsibility is sharp and clear. When charged with complete responsibility for the well, the contractor doesn't hesitate to make decisions.
- The contractor, accepting perhaps greater risks, is compensated by an opportunity to achieve even greater efficiency by being able to run virtually the entire program the way he feels best.
- Because his responsibility is greater, the contractor must—in his own interest—maintain close, detailed supervision over every aspect of the well program.
- The operator is relieved of supervisory functions.

And just as naturally, turnkey drilling does have its limitations:

- The operator must be prepared to trust the con-

continued ▸



DIAMOND
BIT ELIMINATES
35 COSTLY ROUND TRIPS

Christensen Diamond Drilling Bit sets endurance record of 28 rotating days on bottom

The new record was set by a major oil company using an 8-11/32" Christensen diamond drilling bit in Natrona County, Wyoming. After 28 days rotating on bottom the bit was pulled at approximately 16,000 feet and found to be in fair condition. The operating company estimated that 35 round trips and 35 conventional bits would have been needed to drill the same intervals and that the diamond bit saved 18 days.

The bit operated under 10,000 to 16,000 pounds of weight at 53 to 57 R.P.M. The drill string consisted of 4-1/2" drill pipe, nine 7" collars with a set of jars. A second diamond bit had no trouble reaching bottom and ran for 16 rotating days, also surpassing the old 13 day record for the area.

For "Less Cost Per Foot" drilling, contact Christensen Diamond Products Company for information about its complete line of diamond bits and core barrels.

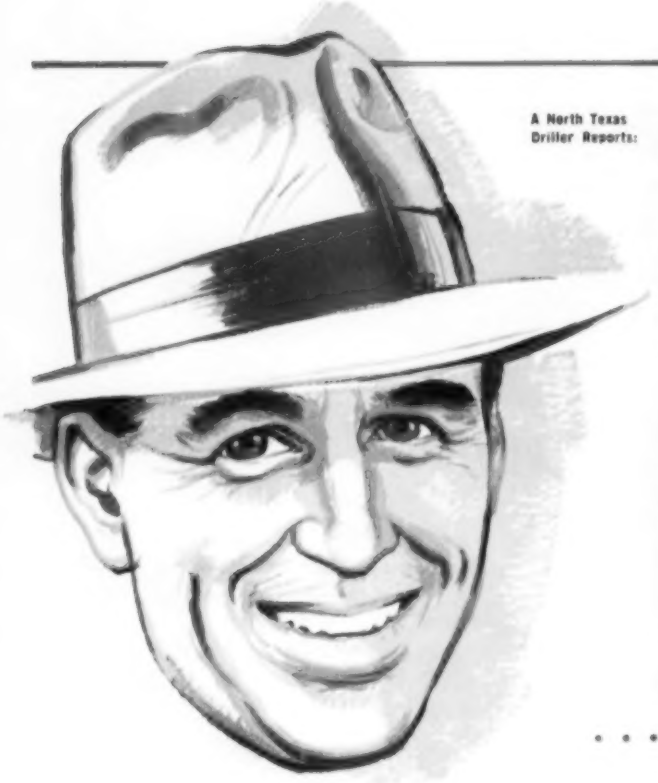
"Less cost per foot."

CHRISTENSEN DIAMOND PRODUCTS

MAIN OFFICE AND PLANT 1937 SOUTH 2nd WEST
P. O. BOX 387 SALT LAKE CITY, UTAH

ANOTHER HOMCO
FISHING AND CUTTING
SUCCESS REPORT

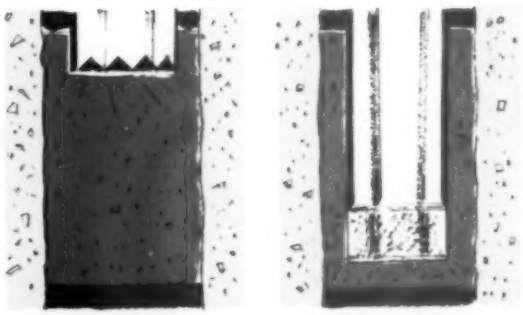
Saved 29 days on 3 recent fishing jobs.



A North Texas
Driller Reports:

"OUR 'KLUSTRITE' ROTARY SHOE SPLIT A DRILL COLLAR IN RECORD TIME."

"We stuck a 3' change over sub (6" OD — 2½" ID) and a 6" by 29½' drill collar under the surface pipe. Sub and collar were partly imbedded in the side wall beneath surface pipe. *Using three 'Klustrite' rotary shoes, the sub and drill collar were split longitudinally.* The bore I D of the collar was bisected, so that half of the collar was left in the side wall, the other half was brought out of the hole. The hole was then opened to full diameter and normal operations resumed. *Using 'Klustrite' shoes this job required only three days. Ten to twelve days is the normal requirement when using conventional mild steel rotary shoes."*



An Operator In
Oil Center, N.M., Reports:

"THE 'KLUSTRITE' SHOE WE USED PENETRATED 20 TIMES FASTER THAN A CONVENTIONAL ROTARY SHOE."

"We used a 'Klustrite' flush bottom shoe to wash-over a holddown packer in an open hole well. We had previously run a conventional hard metal shoe, but were able to penetrate only 3" in 39 hours. *Homco's 'Klustrite' shoe had made 18" in 12 hours when packer started moving down hole.* Packer was followed to TD and was recovered in the washpipe. Shoe was in near perfect condition when job was completed."

LOOKING FOR THE BEST
IN FISHING AND CUTTING EQUIPMENT?
HOMCO HAS IT!

This is the kind of performance you can expect from HOMCO "KLUSTRITE"® MILLING PRODUCTS... in any area... under any condition!

HOMCO
FISHING AND CUTTING

From Cameron Parish, Louisiana, A Driller Reports:

"WE MILLED-UP 65' OF CASING IN 8½ HOURS."

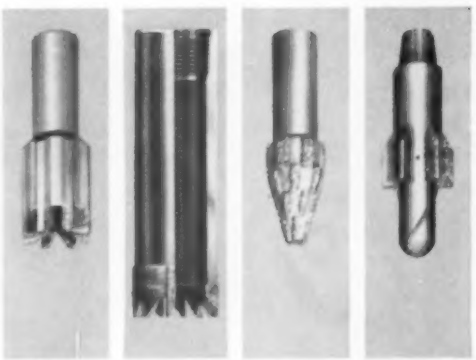
"After three unsuccessful attempts to recover a 5" liner, we decided to mill-up the casing. Using a Homco 'Klustrite' multi-blade pilot mill, we milled-up at 65' of 5" N80 casing from a depth of 9700 to 9765'. Pilot mill was turning at 100-125 rpm with a weight ranging from 15,000-18,000 lbs. *Casing was milled-up at a rate of 7¾' per hour.*"

The most outstanding development in washover and cutting equipment is HOMCO "KLUSTRITE."

"Klustrite" rotary shoes, mills, and reamers have the best all around cutting ability in the industry—have an infinite number of cutting edges on the treated areas. When one edge dulls another takes over. The cutting efficiency of the tool is constant.

To achieve these distinct advantages, the unique "Klustrite" process uses carbide slugs fractured into jagged fragments (about ⅛" to ¼" in cross section). The slugs are then interspersed into a resilient matrix on the tool. The small carbide fragments are supported on all sides by the matrix or bonding material, which is resilient enough to allow some movement of the carbide particles under impact, thus they are able to withstand the most severe shocks without chipping or breaking.

Homco "Klustrite" washover and cutting tools are available through all Homco stores and export offices.



"Klustrite" Type "A" Junk Mill | "Klustrite" Rotary Shoe | "Klustrite" Type "C" Tapered Mill | "Klustrite" Type "CL" Pilot Mill

HOMCO
HOUSTON, TEXAS (HEADQUARTERS)
ASSOCIATED OIL FIELD RENTALS

EXPORT OFFICES
New York, N.Y.
Mexico City, Mexico
Long Beach, California
Maracaibo, Venezuela
Paris, France
Geneva, Switzerland

HOMCO ALSO OFFERS
Electrical Well Services
Oil Field Rentals
Directional Drilling
Complete Supply Service

GET THE MOST

Mission SUPER-SERVICE®

Mission MUD MONARCH®

Mission SILVER TOP®

ONE OF THESE MISSION VALVES AND SEATS WILL GIVE YOU THE MOST FOR YOUR MONEY

Because Mission Valves and Seats are designed to give you the most for your particular service. For *extremely high pressures*, the Mud Monarch® with an effective seal ring even when body and seats are severely worn. Compound 308® and Compound 711 inserts are available. For *medium pump pressures*, the Mission Super Service, with four cross arms for extra strength. And for *low and medium pressures*, the Silver Top with replaceable, wear-taking bushing which greatly reduces valve seat replacement. Compound 308 inserts are interchangeable with Super Service valves. Longer life is built in to all Mission valves and seats to give the most with all popular makes of reciprocating pumps. At supply stores everywhere.

MISSION MANUFACTURING CO.

MISSION MANUFACTURING CO., *P. O. Box 4209, Houston, Texas cable address* "MISSCO" · *export office: 30 Rockefeller Plaza, New York*

In The United Kingdom: MISSION MANUFACTURING CO., LTD., *17 Hanover Square, London W. 1 England · cable address* "MISSOMAN"

TURNKEY ESTIMATE SHEET

1. Drilling Days (Est.)
2. Roads—Location
3. Casing
4. Tubing
5. Christmas Tree
6. Cementing (Limit)
7. Mud—Chemicals
8. Coring (Limit)
9. Drill Stem Tests (Limit)
10. Derrick—Cellar—Pits
11. Fuel—Water—Bits
12. Well Connections—Flow Lines
13. Flare Pit—Flare Lines
14. Packers—Duel Completion Equipment
15. Centralizers—Scratchers (Limit)
16. Acid—Swabbing (Limit)
17. Perforating (Limit)
18. Logs—Surveys (Limit)
19. Floating Equipment
20. Tuboscope (Limit)
21. Miscellaneous Trucking
22. Tank Battery (No.—Size)
23. Separator
24. Dirt Work—Fencing, etc. (Limit)
25. Trucking Rig, Rig Up, Tear Down
26. Day Rates for Over Limit Days
27. Material Returned Not Used (Our cost plus 10%)
28. Limit on Rig Time for Coring, Testing, etc.
29. Dollar Limit on Same
30. Miscellaneous Items

CHECK SHEET is used by Parker Drilling Co. to simplify the more complicated procedure of turnkey contracting.

tractor; that's the only way in which turnkey drilling can hope to succeed. Once the operator has given the contractor the job, he must step out of the way until the well is drilled. This is a concept that is completely foreign to many operating companies, and one which they will not adopt easily.

- Holes requiring a great deal of testing, coring, and the like, are not very suitable for turnkey operations because the contractor simply cannot afford to spend much time on nondrilling activities.
- This type of contracting isn't the best in areas where knowledge about geological conditions and formation depths is hazy.
- Sometimes there is difficulty in interpretation of contract clauses, and extremely close attention must be devoted to the spelling out of contractual obligations.
- One of the hazards to contractors that has turned up so far has been the response of outright promoters to the search for turnkey work. Lacking financial sinews, they hope to lure the contractor into financing the well. Or they want to use the drilling cost estimate to "sell" the well to outsiders.

"Some of these are absolutely legitimate deals," says one contractor, "and you can't run around asking everyone to put up a performance bond for the few who aren't. But a contractor can sure get taken if he doesn't know with whom he is dealing."

Actually, much turnkey drilling is not as inclusive as the term itself. There is considerable variation.

True turnkey drilling means, as one California contractor described it: "They tell us where they want the well drilled; we do the rest." In other words, the contractor has complete charge from spud-in to "turning the oil into the tank."

There is some drilling on this basis, but most turnkey jobs stop short of it. The most common version goes about like this:

The contractor prepares road and location; provides for all personnel, equipment, materials (including mud), and service functions, such as coring, logging, perforating, and testing; runs and cements casing (with the operator usually furnishing the pipe; runs and lands the tubing; and circulates.

At this point, the operator usually takes over the remaining completion work, either releasing the rig and using a workover rig, or putting the drilling rig on day rate for the purpose.

The contractor usually is protected against certain major contingencies (excessive water costs, severe lost circulation, and the like), but the rest of the job is entirely in his lap. He takes care of all bills (and is reimbursed for accounting costs), and is paid a flat price for the entire job.

Turnkeying Not Proven Yet

How does turnkeying stack up, tostwise? The answer hasn't been proved yet, one way or the other. But there are strong arguments on both sides.

The estimates of savings by contractors who seek such contracts range between 5% and 10%.

And the West Texas district superintendent for one major oil company says, "We figure we save between $3,000 and $5,000 on a 4,000-ft. well by using the turnkey method in preference to footage contracts. And the contractors have made some money by being able to run the program the way they want to. We plan to do more of it."

A Mid-Continent major, which is using turnkey drilling on a fairly extensive scale, estimates that its savings resulting from this type of contract last year exceeded $500,000.

This major utilized the approach in virtually all of its divisions, and reports greater savings in some than in others.

Such drilling cost reductions, however, have not been apparent to some other operators.

The West Texas area vice-president for one major says he decided to look at turnkey possibilities when footage bids on one well differed by as much as 100% from each other. But, he adds, when the company sought both turnkey and footage bids for a well in the Sprayberry Trend, the lowest turnkey bid was $6,000 higher than the best footage submittal.

"We've found the contractors aren't too interested in turnkeying unless there are a lot of wells involved in one program," he says.

But contractors who are interested in turnkeying answer with such arguments as this:

"Prices for turnkey work are higher than they should be because operators' specifications are too extravagant. For example, they demand too much topping on access roads. That might be fine if you're thinking in terms of a production access road, but why charge it to drilling expense?

"And the operators keep trying to put more and more

continued ▸

risk on the contractor. If they do that, the contractor has to charge more."

Many operators and contractors aren't sold on the turnkey drilling concept. And some of the skeptics even denounce it.

"It's just another damned way of letting the major companies dig their holes for the smallest contractor profit and with the greatest possible risk for the contractor," declares one drilling firm official.

"Were it not for the current depressed conditions of the drilling industry and the surplus of drilling rigs, no contractor in his right mind would bid on a turnkey contract," another asserts flatly.

"About the only time we'll get into turnkey drilling is when we have an interest in the well," remarks a Gulf Coast contractor. "We won't drill on this basis unless we know the area very well."

The viewpoint of operators who are not sold on the practice is summed up in the comment of C. J. Kerwin, central division production manager for Sunray-Mid-Continent Oil Co.:

"We have let no turnkey contracts in the central division because we haven't been able to justify them on the basis of lowered drilling costs or improved efficiency.

"Although Sunray has discussed turnkey drilling with several contractors, our consensus is that a company such as ours, having adequate field and engineering personnel to oversee drilling operations, has little to gain from signing a turnkey contract."

Others simply haven't made up their minds about it yet, and still others seem to be "inching" into it by letting the contractor take part of the job on a turnkey basis, such as road-building, site preparation, and the mud program.

But many contracting firms are actively seeking turnkey jobs.

Yates Drilling Co., Artesia, N.M., has been turnkey drilling for almost two years. Currently, it has three rigs running completely on a turnkey basis.

Great Western Drilling Co. is doing 5% to 10% of its work in the Permian Basin and Four Corners area on a turnkey basis.

R. B. Montgomery Drilling, Inc., Bakersfield, Calif., has done turnkey work for out-of-state operators, now is finding California operators asking for such jobs, and believes turnkey drilling "is gradually coming."

These are just scattered examples of the drilling firms that are looking for, or are willing to take, turnkey contracts. There are many others.

The experience of Parker Drilling Co., Tulsa, reflects both the good and bad features of turnkey drilling.

In a letter sent out recently to most of the major oil companies, Parker noted:

"There is a definite trend in most major companies toward investigation of the possibilities that the use of turnkey contracts have to offer. Our company has probably done more turnkey contract drilling than any other and, through this background, we have come up with some interesting experiences."

The possible advantages of turnkey contracting were listed by Parker as:

(1) Reduction of the operator's overhead and personnel requirements.

(2) Simplifying of accounts and invoicing.

(3) Reduction of lost motion in the operator's organization, program, etc.

"The turnkey contract price should include all expected costs, plus a fair profit for the financing, drilling, and risk of the well," the letter noted.

Parker believes that certain conditions must exist if turnkeying is to be cheaper to the operator than footage contracts:

- Lost motion and duplication must exist in the operator's organization.
- The cost of operator overhead and personnel requirements on footage supervision must be considered.
- Complete freedom of operation must be given the contractor on a turnkey job.
- Total well cost must be compared, not just contract footage invoice and supplies.

In turnkey drilling, Parker notes, "the contractor actually finances the operator's development costs" because the contractor meets most, if not all, of the bills. This is advantageous to the operator because he is assured of a more financially stable contractor. But the contractor must include some kind of interest or "acounting charge" in his over-all bill to protect his financial investment.

The operator has the option, of course, of making partial payments during the drilling job, thus reducing the interest charges. But at the same time, this qualifies contractors who are financially able to bid on turnkey work.

Any contractor considering turnkey work must make his mind up to one fact: He must have a larger, more rounded staff than is necessary for footage or day rate contracting.

Ideally, the contractor must be prepared to handle not only drilling problems but even, to some extent, geological, land, legal, and production questions connected with the well.

It depends, of course, on just how far the operator wants to go with the turnkey approach. But any turnkeying is going to demand more service.

The contractor will have to take care of the accounting and the purchasing, the mud program, and so forth.

This gives an edge to contracting firms that have production of their own, and a reservoir of personnel to handle the additional work.

And the contractor had better accept the fact that he must look over any turnkey job a lot more closely than the average footage contract to which he is accustomed.

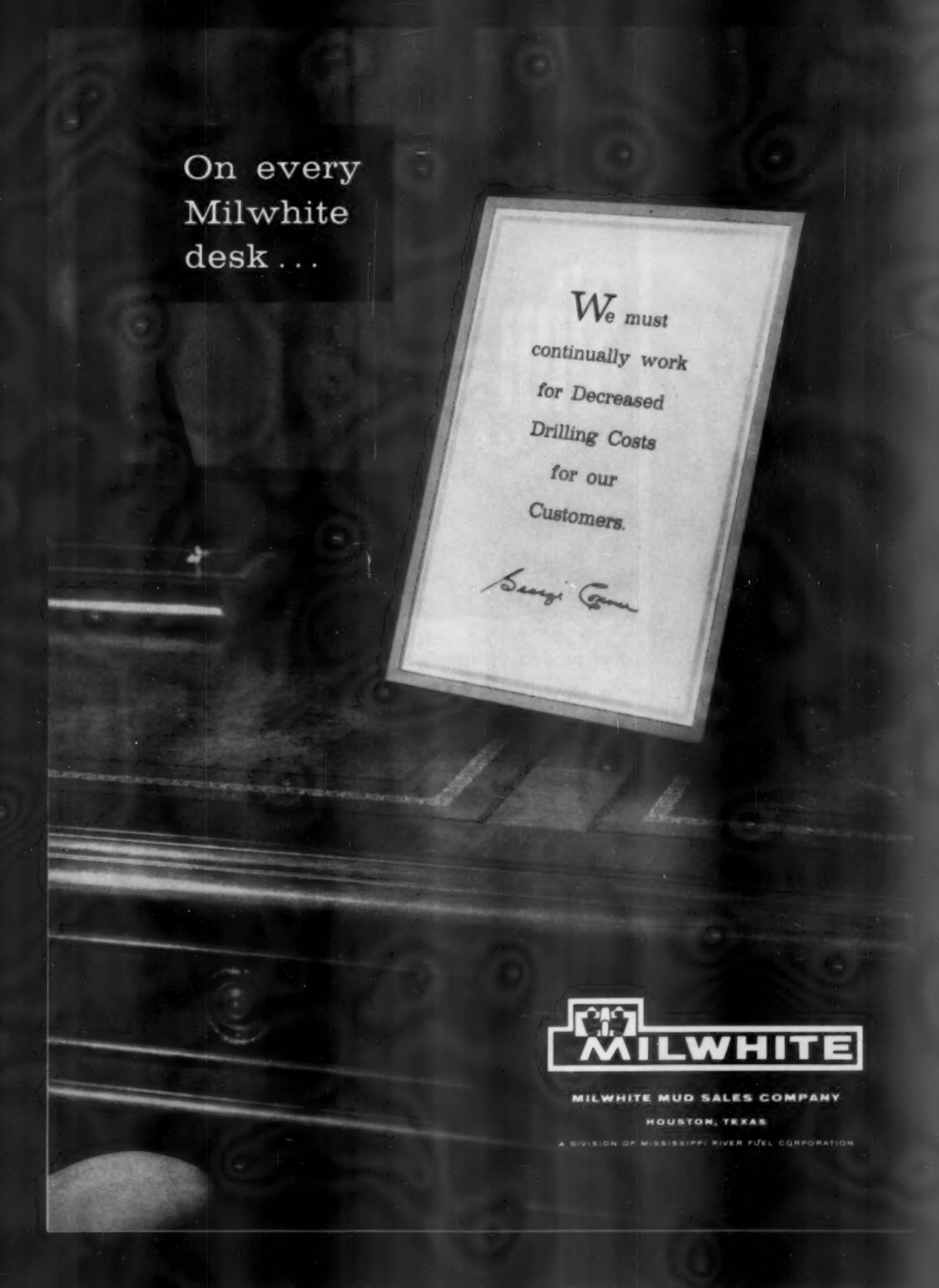
Most of the contractors going in for turnkey work are fairly adamant in the position that turnkey contracts must be negotiated, rather than bid. Parker explains it this way: "because of the many considerations and the amount of complete understanding that must exist between contractor and operator to provide a practical and economical contract."

In other words, everything must be spelled out very carefully in advance.

Says G. C. Colwell, Parker vice-president: "The human element is much more important than with the footage bid. It has also been my experience that what you agree to with a production man, and the interpretation placed on some clause of the contract by the company's geological or legal departments, may be two very different things."

Colwell, who bids most of Parker's jobs, says he spends an average of three days on a turnkey contract, compared with the half-day usually required for the standard footage contract. The extra time, he notes, is "time you don't collect for unless you get the contract."

continued ▶


On every Milwhite desk . . .
We must continually work for Decreased Drilling Costs for our Customers.
MILWHITE
MILWHITE MUD SALES COMPANY
HOUSTON, TEXAS
A DIVISION OF MISSISSIPPI RIVER FUEL CORPORATION

Slim Hole
SPECIALISTS

For proven drilling economy, you can depend on

ROWLEY DRILLING COMPANY

■ Reduced footage costs ✚ less steel requirements 〓 slim hole drilling economy. Experience on toughest assignments for major oil companies has proven that Rowley's slim hole techniques meet today's demand for low cost drilling. Domestic and foreign inquiries invited.

ROWLEY DRILLING COMPANY

Shreveport, Louisiana • Natchez, Mississippi

DOUBLE-ACTING, two-cylinder Tornado Booster Compressor unit, built by Well Completions, Inc., is for air/gas drilling.

Most contractors seeking this type of business have developed check sheets to simplify the more complicated procedure. Colwell, for instance, uses an estimate sheet listing some 30 different items most commonly specified in a turnkey contract, in order to compute the final price to be submitted to the operator.

Added to the final price calculated by the contractor is a "cushion" ranging from several hundred to several thousand dollars to cover unforeseen risk contingencies.

Some operators offer turnkey incentives by providing for a split in savings.

For example, the operator may establish a "typical" mud program for the area. But if the contractor can successfully drill wells cheaper by departing from it, the operator and the contractor split the savings.

The same agreement may apply to the water bill, or any number of other such items.

Regardless of the future of turnkey drilling, one thing is certain—it is at least being considered by many operators and contractors. And some, at least, feel that it will become common practice.

"A good, workable turnkey contract can effect a substantial savings to any operator in certain specific areas or under certain specific conditions," says Parker Drilling Co.'s Colwell.

"The trend to turnkey operation seems to be one of the few new trends discernible in the California picture," comments one observer.

"Although it gives us a chance to make a greater profit, we also run greater risks," adds an official of a Permian Basin contracting firm. "But the operators are cutting back on personnel all the time. In the next few years, turnkey drilling will be the coming thing."

"The contractor who doesn't see this coming and doesn't get ready for it is sticking his head in the sand," says a major company spokesman.

"In my opinion, this sort of arrangement would be suitable to the majors because they could save money by eliminating a lot of personnel," observes the president of a Houston drilling firm. "To me, there's not much difference between a contractor who drills a well with a turnkey contract and a contractor who builds a refinery for a major company."

Air Drilling Gains

Air drilling and its variants, such as gas and "mist," are continuing to increase in popularity. Where it is applicable, the technique offers the twin appeals of fast drilling and reduced costs.

In terms of the total number of rigs using air or gas as the predominant drilling medium, the picture isn't too impressive.

One source in close touch with the situation estimates that the total may be as low as 50 rigs, excluding rigs that may utilize the technique occasionally.

But using activity as a reference point, the increase so far this year over 1959 verges on the spectacular.

One good indication is this sales experience of Reed Roller Bit Co.:

"According to our records, we have sold seven times as many air bits through the first eight months of 1960 as we sold in the entire year of 1959."

Hughes Tool Co. says its sales of air bits are up "several times" over the 1959 rate.

These can't be used as direct barometer readings of air drilling activity, however, because of several factors. One is the fact that many contractors have been air drilling for some time with conventional rock bits (basically the same as air bits, but lacking air passages to the bearings), and have just now begun to switch to the specially designed type.

And some are still using the conventional bits.

Nevertheless, the increase is an indication. Another is the estimate by one reliable source that "we think there may be 25% more rigs using air or gas now than there were last year."

One authority on air/gas drilling footage says that there is no doubt that this year's record will far surpass that of any previous year.

A confidential company report from one drilling area notes: "Because of the recognized success of the method here, contractors are being forced to try air and gas drilling in order to stay competitive."

The increase in activity is even more striking when it is realized that the air drilling technique is confined, for the most part, to relatively limited areas.

Most of the air drilling is taking place in the Appalachian area, in eastern New Mexico, and, in a more scattered fashion, through portions of Texas, the Four Corners, Oklahoma, the Rockies, and Arkansas.

The use of gas as a circulating medium is fairly common now in the Texas Panhandle, the Four Corners vicinity, and eastern New Mexico. And industry sources look for a substantial pickup in air/gas drilling in West Texas, particularly in the Pecos County area, where Transwestern Pipeline Co. recently opened its new gas pipeline to California, with initial deliveries at the rate of 50-million cf/d (PW—Aug.19'60,p78).

continued ▸

New Mexico Is Focal Point

Air drilling has fallen off somewhat in some areas, picked up a bit in others. One of the brightest spots for air drilling this year has been the general vicinity of Artesia, N.M.

At times this year, according to a source that has watched the activity country-wide, as many as 18 rigs were utilizing the air technique in that area, compared to only two or three last year.

Actually, it took several years for the method to catch on in this vicinity. But once the economics were demonstrated, a surge was kicked off that is still going strong, particularly in the Abo Trend.

The experience of one contracting firm—Yates Drilling Co.—provides a dramatic illustration of the benefits that can be achieved with air drilling: The average per-well cost was cut by between $30,000 and $45,000; drilling days were cut from around 60 per well to an average of 14.

The Artesia firm started experimenting with air drilling in the hard chert-anhydrite-limestone country of eastern New Mexico as far back as 1955.

By the time the Abo Trend drilling play got under way (PW—Apr.29'60,p25), Yates was ready to make its strong air drilling push.

"There were a lot of people around here who simply wouldn't believe it could be done," says Ken Reynolds, company drilling superintendent. "It took a lot of showing."

"The normal drilling time with mud when the Abo play got under way was about 60 days, using 60 to 80 bits, to depths of around 6,000 to 6,200 ft.," says Jim Miller, vice-president and general manager. "A completed well at the time cost from $95,000 to $110,000. Some operators are now using clear water as the drilling fluid. These holes are completed in about 26 days, with around 30 bits, at an average cost of about $79,000.

"When air drilling started, it was normal to drill a well in about 20 days. Now the average is about 14 days, using 9 or 10 bits. The average cost of a completed well with air drilling is about $65,000."

Yates recently drilled some 30 holes, finding it necessary to mud up on only two of them, both below 4,000 ft., because of encroaching water volume.

The air drilling program in the Artesia area now has settled down to virtually a routine. Most of the holes being sunk now are development wells.

This is the normal program: A regular rock bit is used to drill an 11-in. hole to 750 ft., where 8⅝-in. surface casing is run. Conventional rock bits (usually only one or two) are used to a depth of about 3,000 ft., then Yates goes to the chert type bits specially designed for air drilling.

Yates uses 4½-in. drillpipe, drilling a 7⅞-in. hole, which usually is cased with 5½-in. pipe, although 4½-in. casing is sometimes used.

It takes considerable air compression to drill successfully. Yates tries to maintain an air input rate of 2,000 cu. ft. per minute or better in a 7⅞-in. hole around 6,000 ft. in depth.

Yates uses both Ingersoll-Rand and Gardner-Denver compressors. The company says it obtains about 11,050 cfm. capacity with the larger Ingersoll-Rands and about 450 cfm. with the smaller Gardner-Denvers at 350 psi. pressure (the altitude of the area reduces capacity, compared to Gulf Coast performance). By varying the number and type of compressors, Yates can attain a wide flexibility in the rate of air circulation, and sometimes, especially on deeper holes, is able to kick it up to 2,500 cfm. or more.

MIST spews out of this flow pipe on a Yates Drilling Co. rig in the Abo Empire field, N.M., hotspot of air drilling.

Depending on the amount of water encroachment, Yates uses operating pressure of 200 to 275 psi. in the 4,000-to-6,000-ft. depth range, obtaining a maximum velocity of returns of about 5,000 ft. per minute in dry formations, down to around 3,000 ft. per minute in wet formations.

The compressor factor is a sizable money item in air drilling. Yates estimates that it costs well over $100,000 to equip a rig with sufficient compression.

Company officials say it costs about $110,000 to attain a 2,000 cfm. compressor capacity, the minimum needed for air drilling in the area.

In addition to the compressor units (engine and compressor), there must be such equipment as mist injection pump, manifold hook-up, rotating head assembly, flow lines, and maintenance materials.

By far the biggest problem with air drilling is the maintenance headache, company officials add. The lack of pipe buoyancy and the effects of heat are others.

The inherent conditions of air drilling, particularly the dust, makes maintenance the contractor's biggest continuing concern. Damage to working parts, particularly valves, necessitates frequent overhauls at a substantial expense.

"It almost requires the establishment of a maintenance section," comments S. P. Yates, president of the drilling firm.

"This type of drilling puts more of a strain on the drawworks because there is no buoyancy of the drill pipe in the hole—all the weight is put on the works," Miller explains. "And during the summer, the heat poses quite a problem in compression. We use extra cooling equip-

continued ▶

"I don't believe in fluid-loss additives!"

Maybe *you* don't, Oliver, but have you heard about all the service companies that *do*? Their fracture extension calculations—more times than not—predict the need for an effective fluid-loss additive. And that's where remarkable new ADOMITE-MARK II comes in.

In over 25,000 fracturing treatmenta, ADOMITE fluid-loss additives have produced a consistent record of larger fractures and faster payouts . . . with greatest long-run economy!

So, don't be fooled or tempted by the lower initial cost of less satisfactory techniques.

For larger fractures per volume of fracturing fluid . . . or same-size fractures with less fluid volume . . . insist on ADOMITE!

Remember: among operators who use a fluid-loss additive, eighty per cent choose ADOMITE!

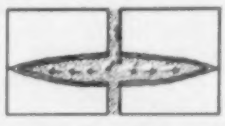
Changed your mind, Oliver?

For more information, contact your service company or the nearest ADOMITE man:

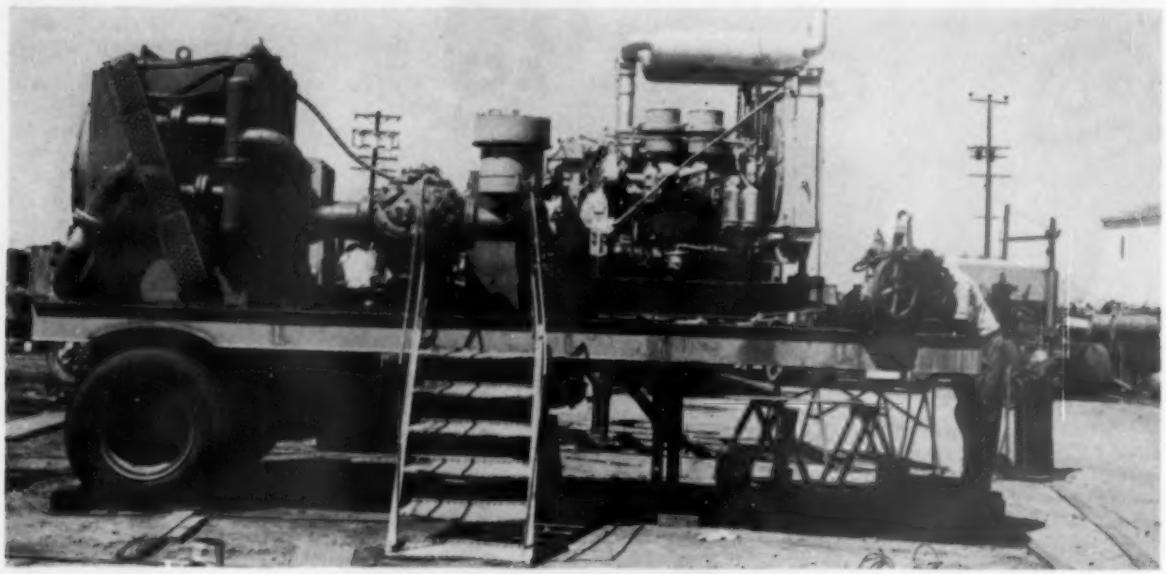
R. T. Means, P.O. Box 431, Midland, Texas, MU 4-7411
T. M. Brown, Pampa, Texas, Phone MO 5-2992
J. M. Foster, Wichita Falls, Texas, Phone 723-8181
J. D. Hawsey, Midland, Texas, MU 4-7411
R. W. Hughes, Oklahoma City, Okla., Phone CE 2-1371
H. L. Thomason, Casper, Wyoming, Phone 3-3721

ADOMITE®

... fluid-loss additives



"25,000 larger fractures can't be wrong!"



TRAILER-MOUNTED air/gas drilling units, developed by Air & Gas Completions, Inc., will cut transport and rig-up costs.

ment, but we still have a problem attaining sufficient compression, coupled as it is with the thinner air."

Penetration rates are extremely fast while drilling is in the "dust," slower when water is encountered and "mist" drilling begins.

So far, Yates' best penetration record from spud-in to total depth (6,350 ft.) was an average of 34.32 ft. per hour on the Hondo-Western-Yates No. 22-A State, Empire Abo field, Eddy County, using two conventional and four chert type air bits.

The best single run was on the Hondo-Western-Yates No. 11-A State—2,252 ft. in 72 hours with a chert type air bit.

Reynolds says it is possible to achieve a penetration rate of 60 ft. per hour in the dry formations, such as the San Andres and Grayburg limestone, but that the bit bearings "won't stand up to the 65,000 to 70,000 lb. of weight and the 50 to 60 rpm. necessary to get such penetration.

"So we put about 40,000 to 50,000 lb. on the chert type air drilling bits and use 50 to 60 rpm."

But direct comparisons are difficult to make because penetration rate and bit life both are much better in the upper, dry formations than in the lower, wet formations—and the water is encountered as differing depths, ranging from 1,200 to 3,100 ft.

Yates simply goes to "mist" drilling when water is encountered, using foaming agents to keep cuttings sufficiently light for air lifting.

The firm says that, of all the water shut-off materials tried, squeeze cementing worked the best, but that even this method only sealed the zone off partially, and cost between $2,000 and $4,000 per job.

"The contractor hasn't enough profit margin to pay for this kind of work," Yates remarks.

So the firm starts injecting a commercial detergent, mixing it in a ratio of 1 to 1½ gal. per bbl. of water, when water begins to encroach into the hole.

If the intruding water were not foamed, it would form too heavy a mixture with the cuttings to permit efficient air lifting. The returns blow out through the flow pipe in a fine spray or mist.

Both the air and "mist" methods have been credited in the area with helping find producing zones.

The fact that the pay zones are not invaded by a drilling fluid makes it easier to locate them. And samples obtained during the "mist" drilling phase reportedly are easier for geologists to work with than the finely-powdered returns yielded during straight run drilling.

Specialist Firms Sprout

The increasing interest in this drilling method is resulting in the formation of more specialist firms. One California contractor is furnishing air or gas drilling equipment to other contractors.

Air & Gas Completions, Inc., a wholly-owned subsidiary of Shamrock Drilling Co., Los Angeles, reports that its business is up some 80% over last year, an indication of the fact that air/gas drilling is beginning to make inroads on the West Coast.

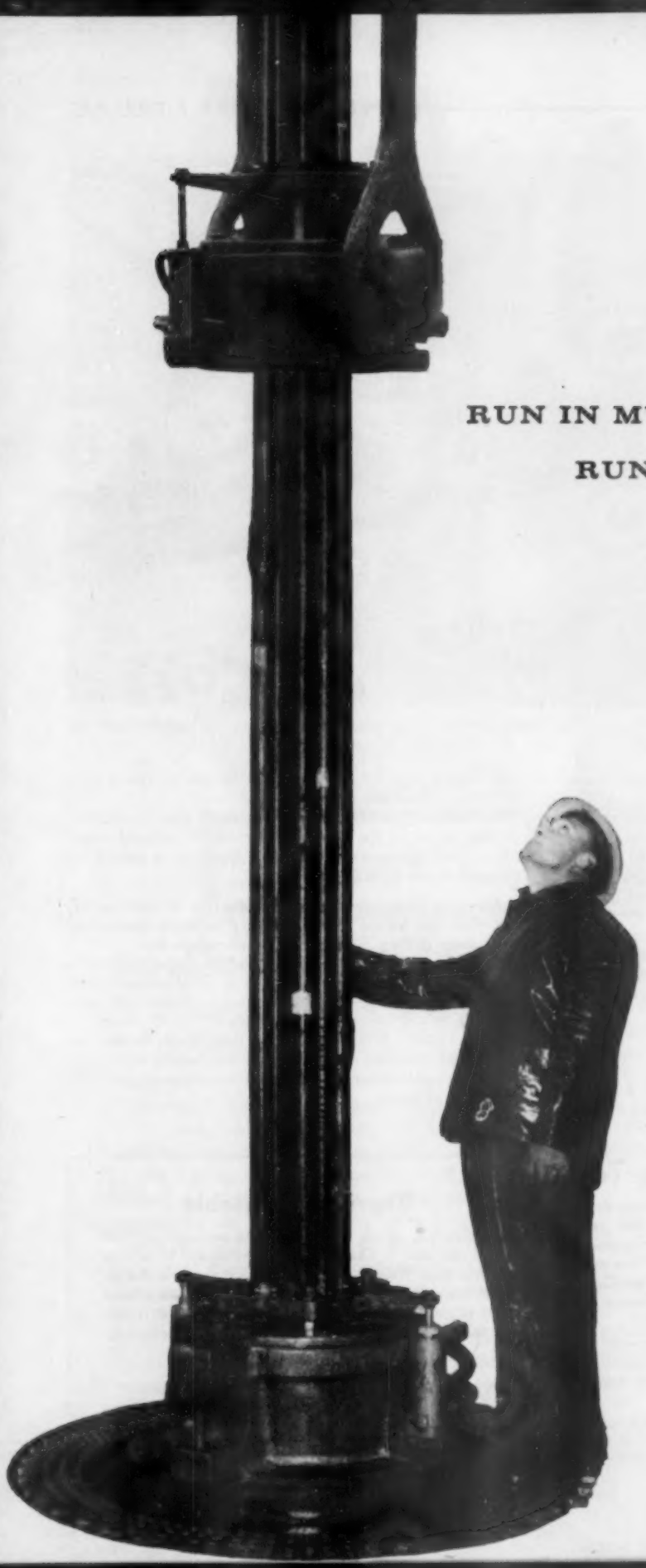
The firm does air or gas drilling on its own, or furnishes the necessary equipment to other contractors who use their own rigs and crews.

Up to now, the company has operated with skid-mounted equipment. Now it is putting together a trailer-mounted unit, which will contain 2 GMC twin 671 drive engines, a Joy Manufacturing Co. WN 102 two-stage compressor (750 cfm. capacity at 265 psi.), and a Carr Manufacturing intercooler and aftercooler.

A&G believes this will cut transportation and rigging costs about 50% ($750 to move in, rig up, tear down, as compared to $1,500), and will increase speed in changing locations.

A&G has also developed a "vacuum and separating sub" for air or gas clean-out work, with which the firm believes it can bail in as little as eight hours a well that would normally require 30 days to clean out.

continued ▸



RUN IN MULTIPLES

RUN UP PROFITS

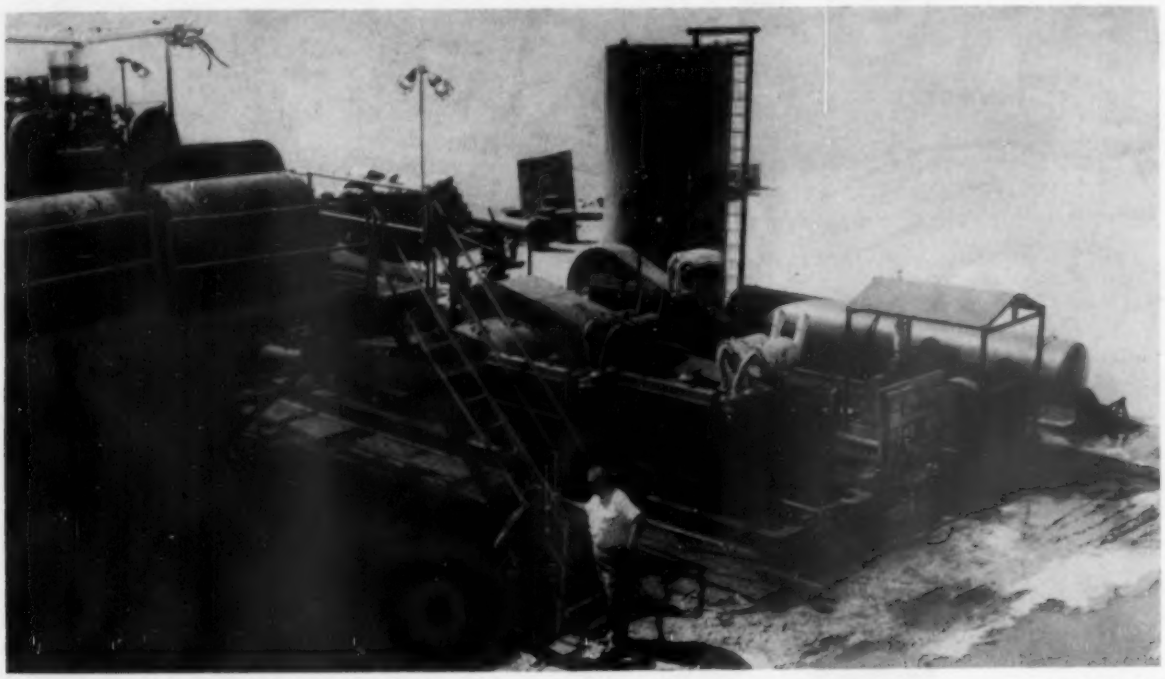
Brown multiple-string elevators and slips let you run all tubing simultaneously when completing multi-zone wells. You can cut time and trouble — actually change your profit picture with this handy combination. Stingers can be securely locked in packers, all equipment can be made up and thoroughly checked before going in. No more fumbling in deviated holes, yet you can retrieve strings one-at-a-time, and replace them at will.

Next time you run parallel tubing, call Brown. Experienced service crewmen with all the equipment you need — including multiple Blowout Preventers are ready to help. Just phone our nearest representative for a smooth, safe, simplified completion.

BROWN
OIL TOOLS, INC.

8490 KATY ROAD P. O. BOX 19236,
HOUSTON 24, TEXAS

See our color movie covering the first five-string completion in its entirety — contact Brown Oil Tools, Inc. at any office.



A BIG PUMP (Continental-Emsco DA 700) is used by Tine Gaiser Drilling Co. to boost penetration rates on medium-depth rig.

Two firms have just been organized to specialize in air drilling on the international scene.

Airdrill International, Inc., Denver, will specialize in feasibility studies and program planning for air/gas drilling operations outside the U.S.

Robert W. Sneed, president of the consulting firm also is vice-president of the parent company, Well Completions, Inc., Denver-based air/gas drilling engineers. Sneed says Airdrill International "could not have been formed two years ago, even though air/gas drilling has been growing in use since 1951," He adds that the changed outlook is due to a rapid spurt in the technology of air/gas drilling in the past 24 months.

The other new company, International Air Drilling Co. (Intairdril), Ft. Worth, was formed to take air-drilling knowhow and equipment "to any location in the free world," according to C. V. Helm, president. It will provide engineering services and specialized equipment for air-mistaerated liquid and gas-drilling operations.

Other Developments Help, Too

The ability to modify, to adapt, to solve problems by coming up with unorthodox applications of known tools and procedures, and to coax new norms of performance from standard equipment acounts for many of the more interesting aspects in the shifting scene. A West Coast sample of this dexterity may help switching between gas and diesel as rig fuel.

Coastal Drilling Co. had been running into difficulty shifting between the two fuels in the field—probably, Coastal believes, because gas is not of a uniform quality. Occasionally, the situation adversely affected rig performance.

Recently, the firm's head mechanic converted a stock diesel engine (making some of the conversion parts himself) into a unit which was fueled by gas, to run a light plant on one of the company rigs.

The unit reportedly performed so well that it attracted the attention of the manufacturer of the original diesel engine and prompted Coastal to apply for a patent on the conversion technique.

Stepping out in another direction is a contracting firm that has added pump capacity normally associated with deep drilling rigs to a medium-range rig.

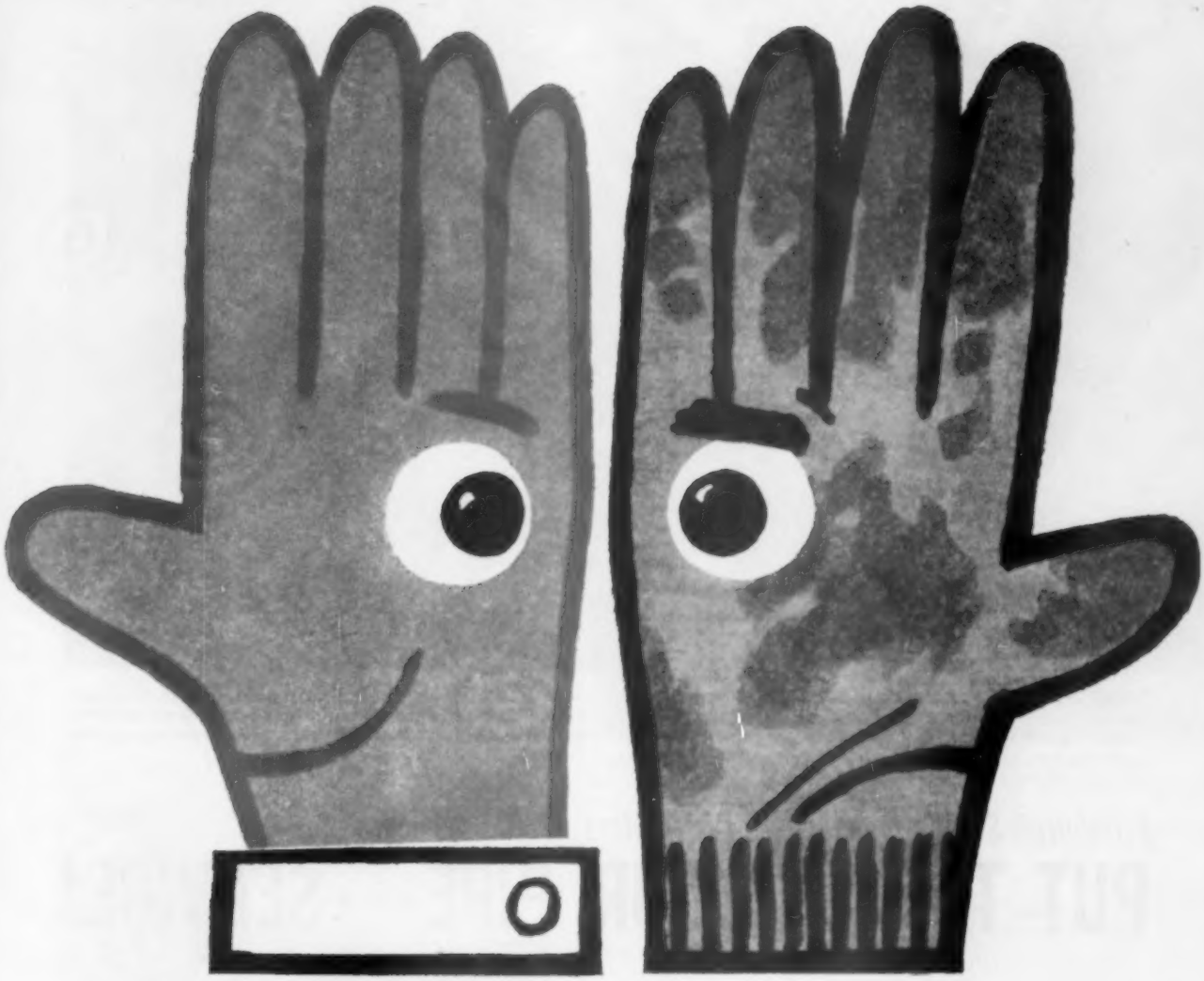
Tine Gaiser Drilling Co., Bakersfield, has equipped a rig rated for 5,000-9,500 ft. with a Continental-Emsco DA 700 mud pump—a piece of equipment normally seen only on rigs working in the 10,000-14,000-ft. range.

Tine Gaiser, president of the firm, explains he was after a higher rate of penetration by employing higher pressures and volumes, and that he can now go to 2,000 psi. without strain.

Reprints Available

Reprints of this report are being prepared and will be available in October. Single copies will be sent to Petroleum Week subscribers on request without charge. Additional copies will be billed at the following rates: 1-10 copies, 50¢ each; 11-100, 40¢ each; 101-1,000, 30¢ each; over 1,000, 20¢ each. Address orders to:

Readers Service Dept.
Petroleum Week
330 West 42nd St.
New York 36, N.Y.



Does the right hand know what the left hand is buying?

Many times in mud buying the smiling left hand is happy because it is concerned only with the mud bill. And that can be kept low. But, a low mud bill often means low drilling efficiency. And that makes the right hand unhappy because it is concerned with keeping the *total* drilling operation efficient and economical.

An inadequate mud system can be responsible for a great deal of unnecessary expense in drilling an oil well. It can cause extra round trips, more bits. It can mean a slower rate of penetration, and time wasted in conditioning the mud. Poor mud can even damage the productive zone.

If these things happen on your wells with a fair degree of consistency, why not review the way "your hands" buy drilling mud. A well planned Magcobar mud program *may* cost a little more than a *cheap* mud program (although it will likely cost even less), but it can and will reduce your over-all drilling cost. It may even help you increase your production!

A *cheap* mud program may be the most expensive single item on your wells. A Magcobar planned mud program, on the other hand, assures the right use of the right products, makes full use of the money-saving advantages of Magcobar Technology. So, why not get all of your hands working towards the same objective? Let Magcobar plan with you to get the best wells at the lowest *total* cost.

Magcobar
Complete
DRILLING MUD SERVICE

DRESSER INDUSTRIES, INC.
OIL • GAS • CHEMICAL
ELECTRONIC • INDUSTRIAL

WELL DONE WITH MAGCOBAR TECHNOLOGY • MAGNET COVE BARIUM CORPORATION

LOOKING UP—Length of drill starts into the hole after change of bits. Falcon Seaboard Drilling Co. of Tulsa is drilling this well with a 9,500-foot string of Pittsburgh Seamless 4½-inch Grade E drill pipe. Falcon Seaboard has used Pittsburgh Steel tubular goods and an independent distributor for many years with pleasing results.

Pittsburgh Steel's Independent Distributors...

PUT THIS IN YOUR PIPE---SERVICE!

Drillers who use Pittsburgh seamless on well after well have a lot more than dependable drill pipe, casing and tubing going for them.

They have what Falcon Seaboard Drilling Co. of Tulsa calls "fair treatment from the mill" and—independent distributors who go more than the proverbial extra mile to provide service.

Boone Smiley, manager of the Mid-Continent Area for Falcon Seaboard, said:

"We've used Pittsburgh Steel's independent distributors through the years in times of short supply and when pipe was readily available. We've always felt that Pittsburgh Seamless did a job for us and the mill has always been fair."

Photographs on these pages show effective results of the close relationship between drillers and operators on one side and a Pittsburgh Steel independent distributor on the other. Here, near Maysville, Okla., Falcon Seaboard is using 9,500 feet of Pittsburgh Seamless 4½ inch O.D. Grade E Drill Pipe on the fourth well the string has drilled in the area in recent months.

The independent who supplied this drill string to Falcon Seaboard sold the first string of oil country tubular goods manufactured by Pittsburgh Steel. Continued progress through the years has been based on *service* to the trade.

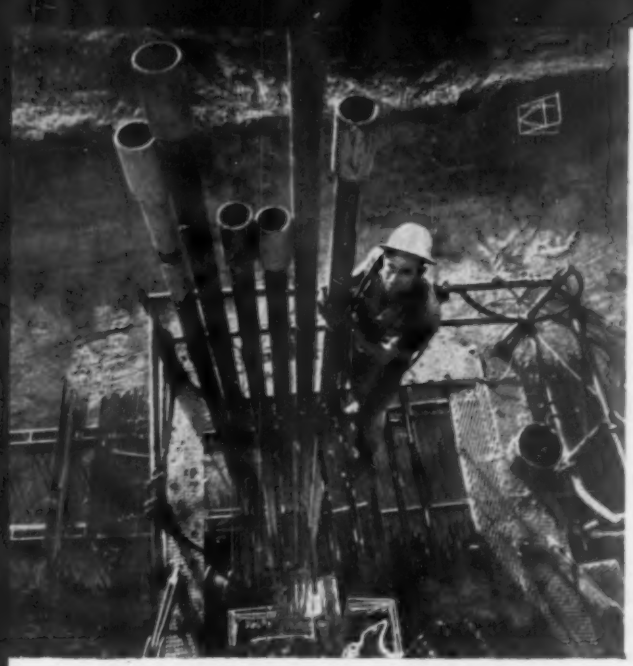
"We can't afford to get lazy," declared William G. Rudd, the distributor's sales manager. "The oil business is always subject to critical emergencies and they all have big dollar signs. It's up to us to pitch in and help."

As a case in point, during periods of acute shortage, this distributor set up a service called the Mid-Continent Pipe Exchange. As a free service to the industry, oilmen were polled for tubular material which they wished to swap for goods more strategically located, or more suited to their needs.

This extra service by Pittsburgh distributors is matched by the extra stamina you always get in Pittsburgh Seamless Drill Pipe—a stamina which stems from long experience in making special steels for the special jobs in the oil country.

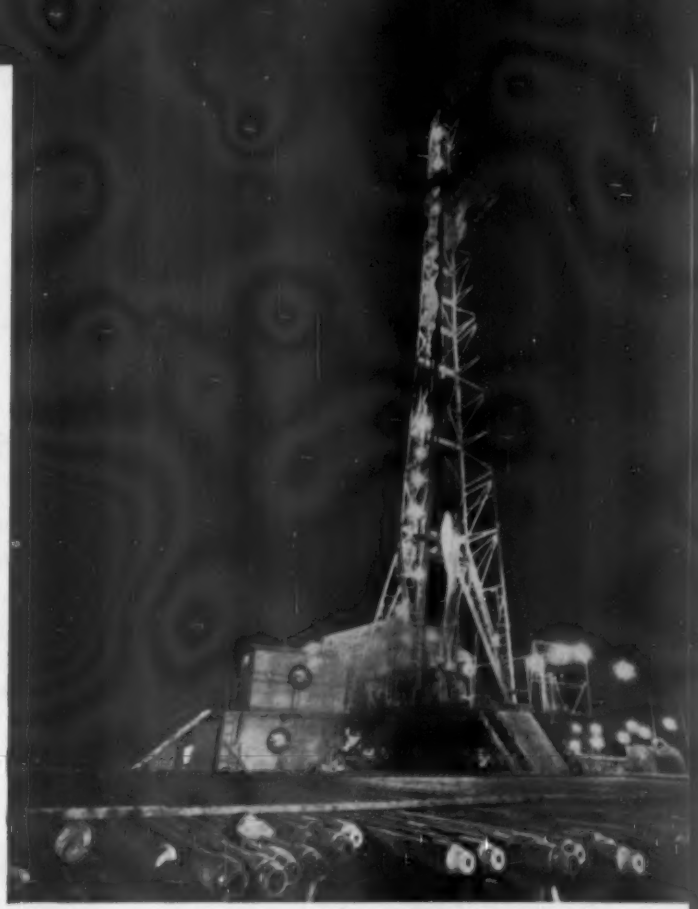
When you buy your next string of drill pipe, or when you're ready to run casing or tubing, remember the combination of Pittsburgh Steel Co. and independent distributors offers you the kind of service—plus the utmost in dependable seamless tubular goods—that isn't available any other place.

It's easy to get lined up with an independent. They're listed at right. Call the nearest one today for quality seamless tubular products.



LOOKING DOWN—On monkey board of 131-foot, A-mast rig, roughneck gets joint of Pittsburgh Steel Co. drill pipe ready for re-entry during a trip. The 9,500 feet of drill pipe shown at top and on racks below was used to drill three previous wells.

Driller Oliver Clark, left, chats with Max Thomas, distributor's representative, and Jewel Smith, Pittsburgh Steel field engineer.



Falcon Seaboard Drilling Co.'s No. 35 rig is at work here on a Sunray Mid-Continent lease near Maysville, Okla.

Geolograph on same rig shows hole is at 4,296 feet with the rotary table, seen at right, operating smoothly. Geolograph chart indicates driller is midway between joint connections.

Distributor Home Offices

Bennett Supply Company Midland, Texas
Bradford Supply Company Bradford, Pennsylvania
Buckeye Supply Company Zanesville, Ohio
C. W. Cotton Supply Company Tulsa 5, Oklahoma
Franklin Supply Company Denver 10, Colorado
Houston Oil Field Material Co. Houston, Texas
Industrial Supply Company Wichita Falls, Texas
Iverson Supply Company Tulsa, Oklahoma
Longhorn Supply Co., Inc. Houston 14, Texas
Lucey Export Corporation New York 7, New York
Lucey Products Corporation Tulsa 19, Oklahoma
McJunkin Corporation Charleston 22, West Virginia
Midland Supply Company Wichita 7, Kansas
Mountain Iron & Supply Co. Wichita 2, Kansas
The Producers Supply & Tool Co. Fort Worth 2, Texas
Production & Refining Equipment Company Odessa, Texas
Sandy Supply Company Wooster, Ohio
Southwest Supply Company Pittsburgh, Pennsylvania
The Straker Supply Company Box 202, Mt. Pleasant, Michigan
Superior Iron Works & Supply Co. Shreveport, Louisiana
Tex-Tube, Inc. Houston 7, Texas
Western Supply Company Tulsa 1, Oklahoma

Pittsburgh Steel Company

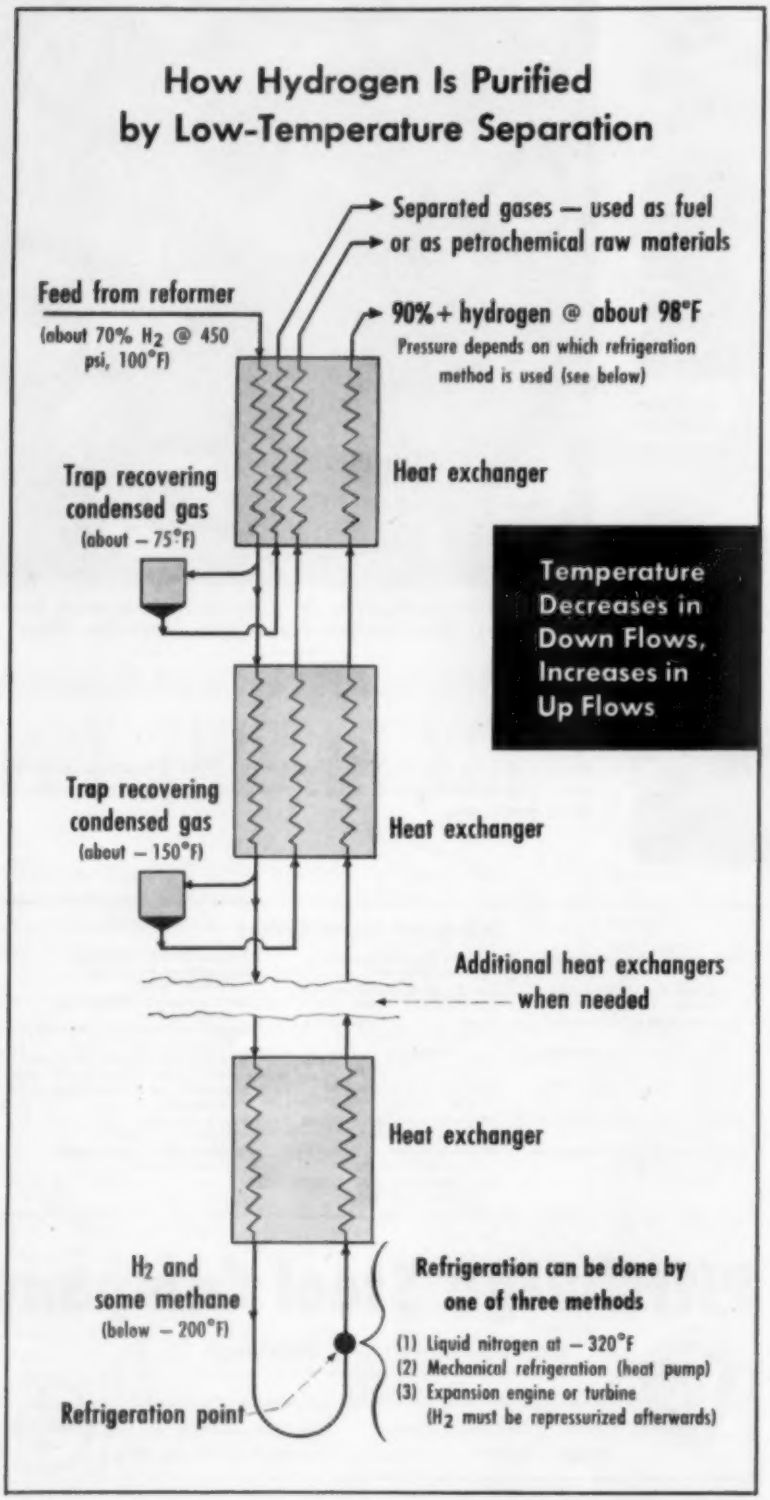
Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta Chicago Cleveland Dayton Detroit Houston Los Angeles New York Philadelphia Pittsburgh Tulsa Warren, Ohio

Steel

Purer Hydrogen—at Reasonable Cost



Next development in refining: the upgrading of recycle gas to obtain purer hydrogen.

The use of hydrogen in refineries has been increasing steadily (PW—Sep.4'59,p36); many major oil companies and engineering firms have developed processes for the treatment of refinery products with hydrogen, over a catalyst. Autofining, Hydrodesulferizing, Hydrocracking, Hydrofining, Ultrafining, and Unifining are among the best known.

The hydrogen required for these processes is generally obtained from catalytic reforming. It is not pure hydrogen, of course; typically, the hydrogen concentration is about 70%.

Catalytic cracking operations also result in a certain percentage of by-product hydrogen in the dry gas—although at a much lower concentration, about 35%.

Refiners today feel that a substantial improvement in the various hydrogenation processes could be accomplished if a purer hydrogen—say 90% or better—could be obtained.

This purer hydrogen can be obtained economically by cryogenic—low-temperature — separation methods.

Leading companies engaged in the field of cryogenics are now offering refiners installations for the low-temperature upgrading of hydrogen-rich recycle gas. Among them are Linde Co., division of Union Carbide Corp.; Air Products Corp.; and some chemical construction contractors. Foreign companies with representation in the U.S. are also endeavoring to get some of the business; these include American Air Liquide, Inc., of France, American Messer Corp., of Germany, and the German Linde Co.

It is expected that several such installations will be completed not later than 1961.

The principle of this separation is simple, and its operating cost is relatively low.

Feed gas, at a temperature of around 100F and an average pressure of 450 psi., is cooled in a succession of special heat-exchangers—such as, for example fin-type, aluminum Trane cores—(diagram, left).

The hydrocarbons that are mixed with the hydrogen condense out and are separated at various stages along this series of heat exchangers—according to their boiling points—and

WHERE DO YOU STAND ON COMPUTER CONTROL— LEADING OR LAGGING?

Far-sighted leaders in industry are realizing the benefits made possible by applying computer control systems to their processes.

Working with these leaders, General Electric has already pioneered the application of twenty on-line GE-312 computer systems now being implemented in these basic areas —STEEL, ELECTRIC UTILITIES, CHEMICAL, CEMENT, and PRODUCTION CONTROL for various manufacturing applications.

The GE-312 Computer Control System embodies adaptability and flexibility to meet many types of applications in varying size plants. For example, compare its expansible memory—capacity up to 52,000 words. Compare its flexible input/output—capable of scanning up to 1500 instrument inputs. These are maximum capabilities, expansible from a minimum system. You buy a system tailored to your exact requirements.

Add to this versatile equipment the computer systems engineering ability demonstrated by General Electric in implementing these twenty GE-312 system applications.

Add also the long history of General Electric overall systems know-how—its broad background in the equipment, processes and materials to which you apply computer control.

Tomorrow's profits will come from today's combination of vision, equipment, and know-how. *Where do you stand?*

There are General Electric Sales and Application engineers in over one hundred offices throughout the nation to serve you. *Phone* the nearest General Electric Apparatus Sales Office, or *wire* General Electric Computer Department, 13447 North Black Canyon Highway, Phoenix, Arizona.

PROCESS CONTROL
AUTOMATED BY GENERAL ELECTRIC

Progress Is Our Most Important Product

GENERAL ELECTRIC

CPA-60 (6-60)

General Electric—a pioneer in computer systems for all phases of business, industrial, scientific, engineering, and financial endeavor.

used as cooling media in the heat exchangers.

The temperature of the hydrogen decreases gradually, until a minimum is reached at the lowest point of the unit, where the "motive power" of the entire process is being brought into play.

This can be in the form of:

- An admission of liquid nitrogen (which boils at —320F).
- Mechanical refrigeration, or a heat pump—with liquid helium, for example, as a refrigerant.
- An expansion engine, or an expander-turbine, decompressing the gas stream to about 25 psi.; this produces an intense cooling effect, known as the Joule-Thompson effect.

The stream of 90%+ hydrogen comes out at a temperature only a few degrees below that of the feed.

Preliminary treatment of the recycle gas may be required if water, sulfur, or carbon dioxide is present. At low temperatures, these products would form crystals (ice, sulfur, or dry ice) that would plug the exchangers and be difficult to remove without stopping the unit.

Linde Co. estimates that the operating cost per 1,000 cu.ft. of recycle feed gas varies from 7¢ for a relatively small unit—10-million cu. ft. per day—to as little as 2¢ for a large-volume unit—125-million cu.ft. per day.

The low-temperature purification units are compact and require little maintenance, manufacturers say.

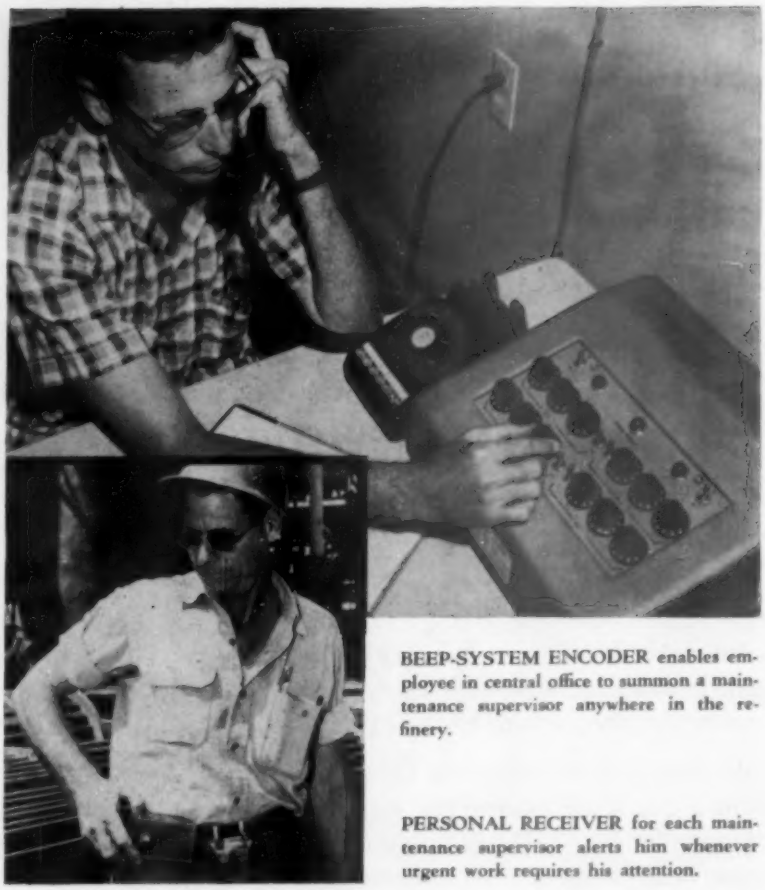
Linde, for example, offers units housed in a cylindrical casing, and packed with powered insulation. They range from 5 ft. in diameter and 25 ft. tall to 8 ft. in diameter and 45 ft. tall.

Some manufacturers are offering such cryogenic equipment on a rental basis. Operation may be conducted by either the refiner of the supplier.

This practice is similar to that followed by suppliers of crude-desalting equipment (PW—Jan.8'60,p43). It offers several obvious advantages from a capital outlay as well as a service standpoint.

The gases separated from the hydrogen in the recycle stream are increasingly in demand as petrochemical raw materials. They need not be sacrificed as refinery fuel gas.

These gases, in the C_2 to C_5 range, boil off at temperatures ranging from —0.55F for n-butane to —258.6F for methane. Because of its low temperature of liquefaction, the latter is generally the most costly to remove, and a small portion of it remains in the hydrogen.



BEEP-SYSTEM ENCODER enables employee in central office to summon a maintenance supervisor anywhere in the refinery.

PERSONAL RECEIVER for each maintenance supervisor alerts him whenever urgent work requires his attention.

The Beeper Always Gets Its Man

Getting hold of maintenance supervisors scattered throughout Gulf Oil Corp.'s Port Arthur (Tex.) refinery is no longer a problem: A "beeper system" makes it practically instantaneous.

Maintenance supervisors may be working most anywhere in the 270,000 b/d refinery, and it is sometimes difficult to locate one when his services are most urgently needed.

Gulf recently installed a "beeper" system that solves the difficulty.

The three-component beeper enables the zone office to alert any of its supervisors no matter where the man may be in the plant.

The three components are:

(1) The encoder, located in the zone office (picture). It has 12 knobs, which make it possible to handle up to 455 selective code signals. Each supervisor has his own code signal. When the zone clerk sets the encoder for a certain code, that signal is repeated every 20 seconds.

(2) The transmitter. It operates at 27.2555 megacycles, and transmits radio signals on an FCC-assigned frequency.

(3) The receiver, a compact transistorized unit, weighing only seven ounces. One of these is fastened to the belt of each maintenance supervisor (picture). It measures 5¾x2⅜x1 in., and is powered with a mercury battery.

The receiver starts "beeping" when the encoder is set for its frequency. (Each receiver is sensitive only to its own code signal.) When a receiver beeps, the supervisor turns it off and calls his zone office on the nearest telephone.

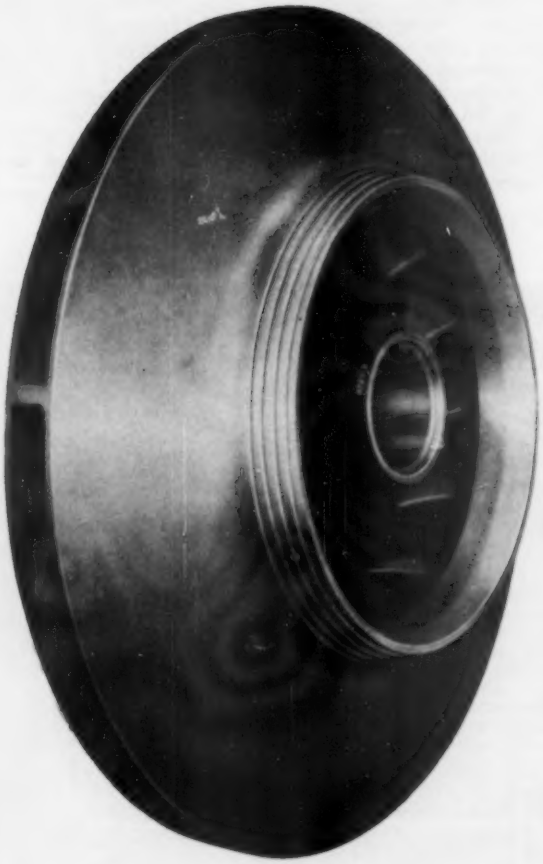
Gulf now has 100 of these receivers assigned to maintenance supervisors, and says that the system is very easy to operate.

Additional receivers can be used, when needed at the Port Arthur refinery, without requiring more encoders or transmitters, up to the 455 units that can be handled by existing encoders.

CENTRIFUGAL COMPRESSORS

DE LAVAL welded impeller

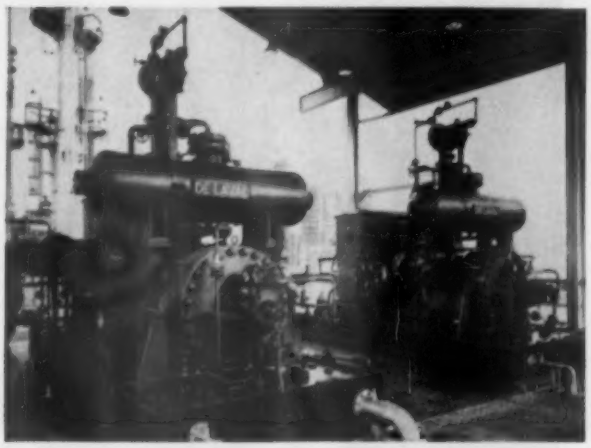
permits higher horsepower, higher tip speeds, greater design flexibility



Now, with a single welded wheel, compressors rated up to 20,000 horsepower at 6500 rpm are giving excellent service.

Produced by a special welding process developed by De Laval, this new welded wheel construction permits higher tip speeds and fewer stages for a given pressure ratio.

Write for more information on this new welded impeller or contact your local De Laval representative.



Shown above are two De Laval barrel type compressors—driven by De Laval turbines—in a typical large refinery installation. Units like these are used to pump heavy and light gases and for supplying combustion air for cat crackers.

DE LAVAL STEAM TURBINE COMPANY
897 NOTTINGHAM WAY, TRENTON 2, N. J.

DL-4850 A

See why ALCOA ALUMINUM makes a good design habit

Requirement: Low-cost, corrosion-resistant heat exchanger material
Key to Good Design: Specify Alcoa Aluminum Tube and Sheet

If corrosion resistance, long life, product purity and economy are considerations in your heat exchanger application, specify aluminum! ALCOA® Aluminum has been solving such problems for over 40 years.

In the petroleum industry, ALCOA Aluminum Tubes serve in main column overhead condensers where their freedom from fouling and excellent heat transfer properties have made them a natural selection. Heat exchangers made of ALCOA Aluminum Tube and Plate are used in the production of ammonia, nitric acid, vegetable oils, naval stores, naphthalene, hydrogen peroxide, oxygen and urea. These and other processes call for heat exchangers with combinations of high strength, excellent sub-zero physical qualities, high thermal conductivity, or nontoxic and noncatalytic properties. ALCOA Aluminum alloys meet all these requirements.

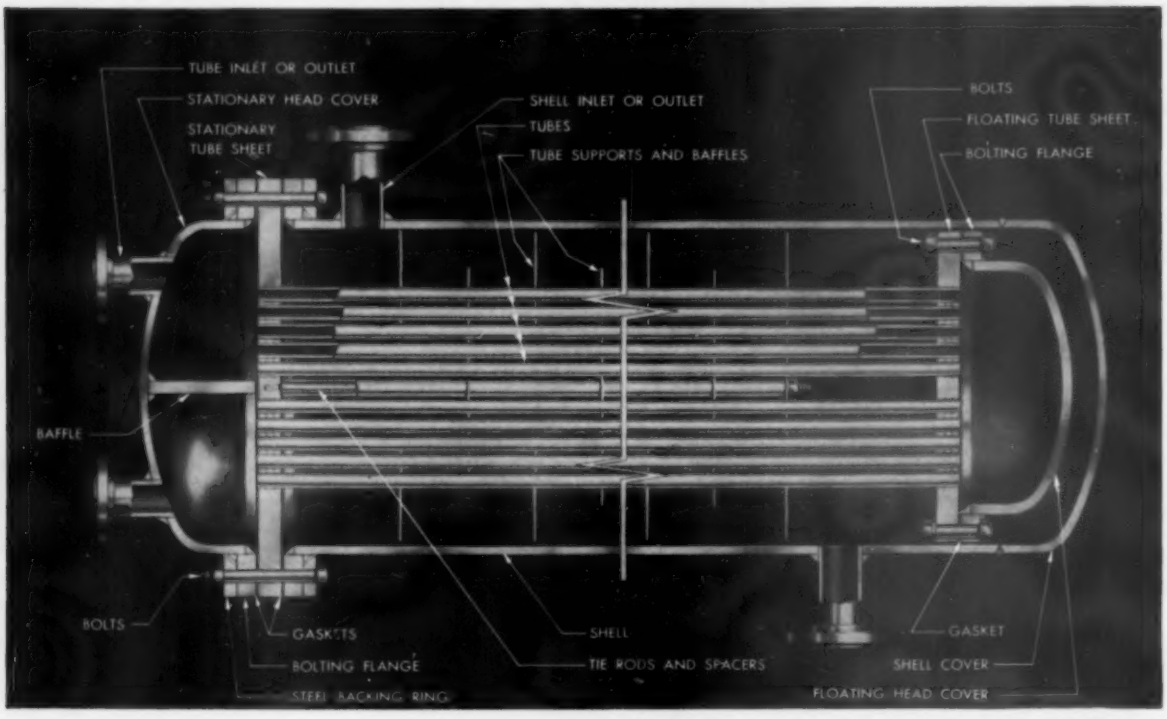
As for cost, ALCOA Aluminum Tube is the most inexpensive. In the common sizes it costs one-third less than mild steel, one-half as much as admiralty, and one-fifth that of stainless.

ALCOA Aluminum alloys are ideally suited to a wide range of maintenance methods. For relatively soft or loose scale, water jets and brushes are usually satisfactory. Wet sandblasting as well as chemical cleaners may be used effectively.

ALCOA engineers have worked closely with all segments of the process industries for over 40 years, and can help you specify the aluminum alloy best suited to your heat exchanger and other process applications. ALCOA's unparalleled experience in this field is available to you for the asking. Write to the address on the coupon, stating your requirements as specifically as possible. ALCOA's development engineers will welcome the opportunity to work with you on your problems.

You can also take advantage of the wide selection of free ALCOA literature on aluminum for heat exchangers and other process applications. Simply check the booklets you want on the coupon and mail to the address indicated. ALCOA will forward your material promptly and without obligation.

ALCOA is conducting a series of engineering conferences on process industries applications of aluminum during 1960 in a number of major cities. Contact your nearest ALCOA sales office for full particulars and dates.

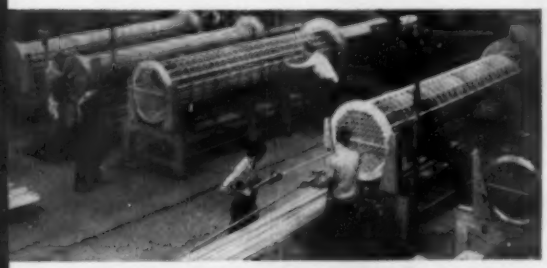


For certain processes where corrosive or sensitive materials are involved, it is often advisable to use aluminum for entire heat exchanger systems to avoid system corrosion and contamination of the product. A typical all-aluminum heat exchanger is shown here. Alloy recommendations are given in the table opposite.

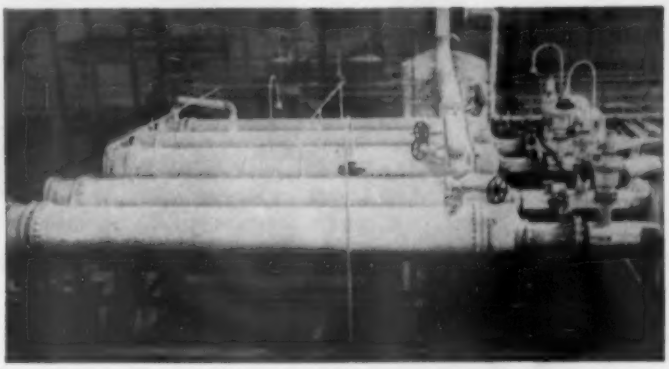
Alcoa Aluminum Tubing protects color in the world's largest rotary steam-tube drier. The drier measures 10 ft in diameter by 100 ft long.

A Midwest utility saved 50 per cent on tubing costs by using Alcoa Aluminum instead of admiralty for tubing in this surface condenser. Successful operation of this unit has led to the installation of similar units by other utilities. This use demonstrates aluminum's economy and superior resistance to ammonia, carbon dioxide and hydrogen sulfide.

A battery of all-aluminum heat exchangers in a polyethylene plant. Selected for initial low cost, these aluminum exchangers provide freedom from product contamination as well as desirable low temperature properties.



Construction of a heat exchanger utilizing Alcoa Aluminum Tube. Superior working properties plus the cold-drawing method by which Alcoa seamless heat exchanger tubes are produced results in close dimensional tolerances and smooth inside and outside surfaces.



This all-aluminum dephlegmator in a large coke plant is used for the regeneration of ammonia liquor in a hydrogen sulfide scrubbing operation. Aluminum tubes lasted five times longer than steel tubes in a similar use.

Alloy Recommendations for Aluminum Heat Exchanger Construction

	Alcoa Designation		ASTM Specification*	Alloy
Tubes		3003-H14	B234	M1A
	Alclad (inside)	3003-H14	B234	clad M1A
	Alclad (outside)	3003-H14		clad M1A
	Alclad (both sides)	3003-H14		clad M1A
		6061-T6	B234	GS11A
		6062-T6	B234	GS11C
Tube Sheets		3004-H112	B178	MG11A
	Alclad	3004-H112	B178	clad MG11A
		6061-T6	B178	GS11A
	Alclad	6061-T6	B178	clad GS11A
Baffles		3003-H14	B178	M1A
	Alclad	3003-H14	B178	clad M1A
Tie Rods		6061-T6	B273	GS11A
Shells & Heads		3003-H112	B178	M1A
	Alclad	3003-H112	B178	clad M1A
		3004-H112	B178	MG11A
		5052-H112	B178	GR20A
		5154-H112	B178	GR40A
Fittings		3003-F	B274	M1A as applicable
		6061-T6	B274	GS11A as applicable
Flanges		6061-T6	B247	GS11A as applicable

*Only the basic number is shown since Alcoa products are manufactured to the latest issue of the specification. The complete number would indicate the year of issue.

Aluminum Company of America, 873-J Alcoa Building, Pittsburgh 19, Pa.
Please send me the following literature covering Alcoa Aluminum for product transfer and other uses in the process industries:

- ☐ 10197 Aluminum Pipe and Fittings
- ☐ 10418 Alcoa Unitrace: Combines Piping and Tracing in One Unit
- ☐ 10270 Alcoa Utilitube
- ☐ 20849 Resistance of Aluminum Alloys to Weathering and Resistance of Aluminum Alloys to Chemically Contaminated Atmospheres
- ☐ 10460 Process Industries Applications of Alcoa Aluminum
- ☐ 11453 Solving Refinery Corrosion Problems with Aluminum
- ☐ 20437 Aluminum Alloy Heat Exchangers in the Process Industries
- ☐ 19416 Brazing Alcoa Aluminum
- ☐ 10415 Welding Alcoa Aluminum
- ☐ 19051 Alcoa Aluminum Handbook

Name_____

Company_____

Title_____

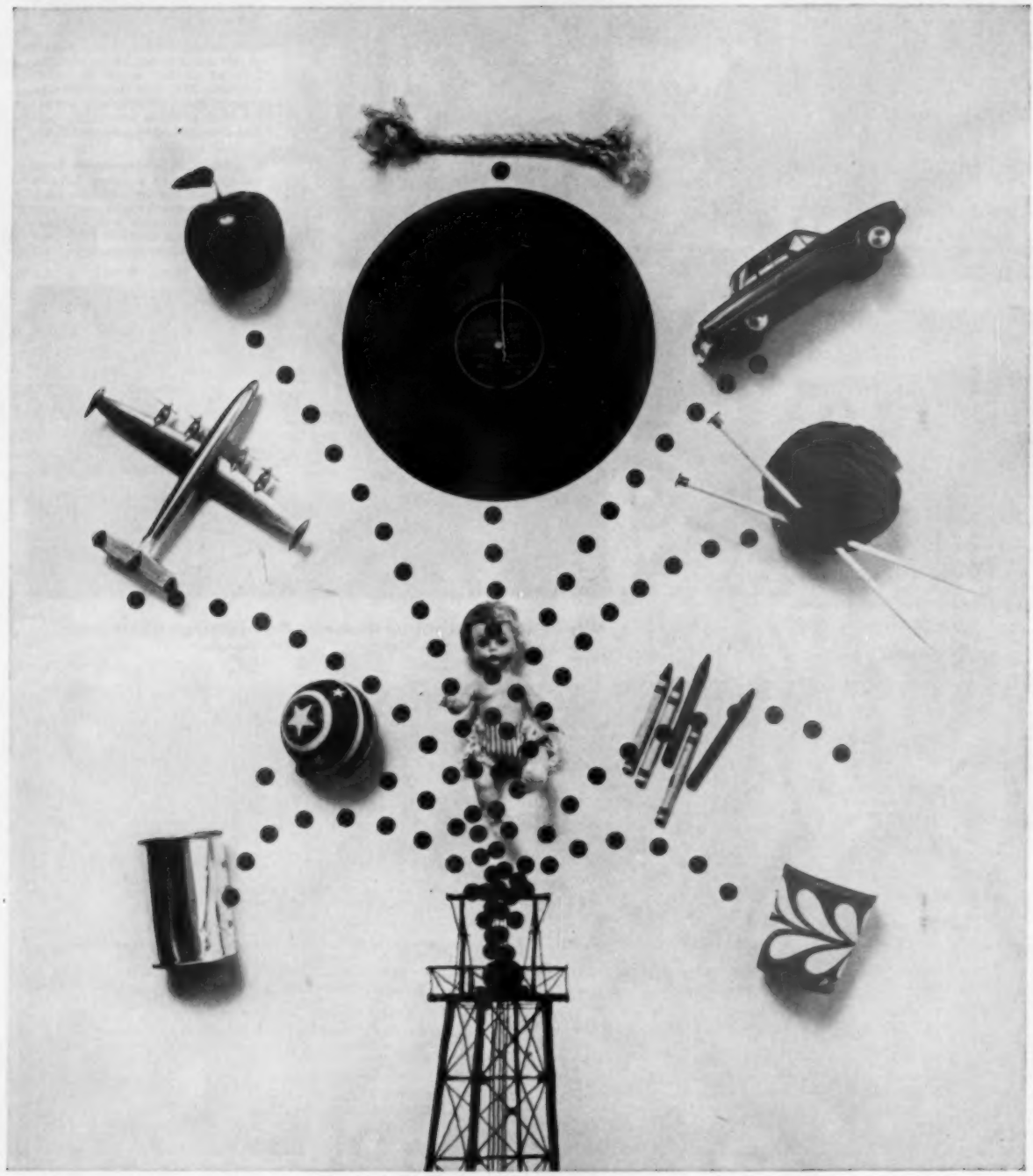
Address_____

City_____ Zone_____

State_____

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

For exciting drama watch "ALCOA THEATRE" alternate Mondays NBC-TV, and "ALCOA PRESENTS" every Tuesday, ABC-TV



"Finding *brand new* uses for oil products is important. Oilmen have relied on inventive people outside the industry to develop uses for our products. It's about time we did something substantial along these lines ourselves."

—M. J. Rathbone, President

Standard Oil Company (New Jersey)

Modern Plants Need Dependable Current

Today's instrumentation and automatic processing call for high standards of current uniformity

A novel concept of electric power dependability is arising as a result of modern developments in the petroleum and other processing industries.

The quality of electric power service required today is far beyond that which public utilities considered adequate even a few years ago. Short interruptions in current, and minor fluctuations in voltage and frequency, which would have had little importance in the late '30s, can be enormously troublesome in today's plants.

How modern processing plants are affected by the quality of their power supply, and what can be done to improve it, was discussed this week at the Joint Power Conference of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers, in Philadelphia, by M. M. Gilbert, of E. I. du Pont de Nemours & Co., and Robert W. Worley, chief power engineer of United Engineers & Constructors, Inc.

The generalized use of electronic instrumentation, and the growing acceptance of automatically controlled processes, require a high degree of uniformity and continuity of electric service.

"Where previously a chemical plant used pneumatic indicating instruments and simple motor interlocks," said Gilbert, "we now find highly sensitive sensing and recording devices; datalogging and static-state memory-storage devices; highly accurate speed, temperature, and flow controls; and even completely automatic plants.

"Operators in a nonautomatic plant," said Worley, "simply restart any machines that stop due to power faults. But the installation of automation, and the substantial investment involved in it, introduce much greater concern for continuous operation.

"A shutdown of a fully automatic plant may result in hours of delay until it can be restarted, resynchronized, and returned to normal production. And this may be due to an interruption of as little as 30 cycles."

It is frequently difficult to make the public utility people realize the importance of such high-quality service, many plant operators feel.

Because of the utility people with whom refiners and processors come in contact initially are commercial representatives, and not technicians. Gilbert pointed out, they do not always understand why the industry needs the degree of uninterrupted service it requests.

But even when the public utility understands that the request is legitimate, the processing plant may not be of a size that justifies for the utility company the expense involved in making the service foolproof.

For example, a public utility may be prepared to install "dual supply mains" for a customer with a demand of 100,000 kw, but it would be unreasonable to expect the utility to invest the amount of money required when the plant has only a demand of, say, 5,000 kw.

In that case, Gilbert contended, it seems fitting that the consumer should pay a rental fee for all facilities over and above what the utility company considers normal for the size of load involved. This is exactly what Du Pont is doing in several of its plants.

There are many ways in which electric distribution dependability can be improved today. But it all starts with a bit of arithmetic: Does it pay?

The first step, Worley warned, is to determine exactly how much dependability is necessary. In other words, the cost of power with "never" an interruption may be much greater than the loss incurred in the case of "infrequent" interruptions.

But in extreme cases—for example, where life may be endangered in case of power failure—installation of a constant alternate source of power may be justified despite the added cost.

The most obvious method of providing high continuity of service is by "in-plant" power generation, either in the form of small standby units—batteries for example—for critical loads only, or with large turbogenerators capable of handling all or a substantial part of the total plant load. A "spinning" reserve generator, said Worley, should always be properly equipped with reverse power relays.

Although public utilities today are quite willing to grant permission for parallel operation between the industrial and the utility systems, consumers generally are reluctant to take that responsibility. "We find it difficult, if not impossible, at Du Pont," said Gilbert, "to justify spending a million or more dollars for in-plant generation."

Most plants, however, should have a diesel or a gas-turbine-driven generator, ready to cut in in case of current interruption of more than a few seconds.

The bad effect that voltage fluctuations may have on electronic instruments can also be obviated by modern methods. The selection depends on the degree of uniformity needed. Some of these methods:

- Parallel distribution lines within the plant, and automatic throw-over switches, transferring the equipment from one line to the other. A motor and capacitor act as an induction generator, to furnish voltage and power during the actual transfer.
- For critical equipment very sensitive to voltage dips, d.c. current may be used instead of a.c.
- Voltage-stabilizing transformers are now on the market which, according to their manufacturers, are capable of stabilizing to within 1%, and within 1 or 2 cycles, voltage variations as high as 30%.
- For short voltage fluctuations, flywheel-type motor-generator sets of fair size may be satisfactory.
- For low-voltage units, the direct-acting trip breakers on the market are rather crude, and difficult to test. But certain manufacturers are developing new direct-trip breaker units accurate within 5 amp. Du Pont has about 200 of these units in its plants.
- A type of equipment that i making rapid progress in processin plants, although it is still expensive, is the "draw-out breaker-fuse combination." By using a current-limiting fuse in case of short circuits, the breaker in the combination can be made substantially smaller and less costly. These units are popular in Europe and in Canada, said Gilbert.

But the most effective way to improve electric service quality is by closer teamwork between all those concerned.

Both speakers at the AIEE-ASME meeting agreed that a more thorough understanding of the problems at stake is essential.

Those who can help are:

- The representatives of the utility company, who must better understand industry's requirements.
- The consulting engineers, who may join industry in the development of better methods.
- The manufacturers of process and control equipment.
- Industry's own power engineers, production engineers, operators, and management.

Will Solid-Film Lubes Work Where Oils and Greases Fail?

Major oil companies are all working toward the development of a lubricant that will work under extreme conditions, where conventional oils and greases deteriorate.

Conditions requiring this type of lubricant include:

- Extremely high temperatures, in the 1,000F range.
- Extremely low temperatures, near absolute zero.
- Exposure to high-intensity nuclear radiation.
- Hard vacuum applications.

In this field, oil men take their cue from the aircraft companies, owing to the space and nuclear-powered aircraft program.

At the Petroleum Mechanical Engineering Conference, in New Orleans this week, C. F. Merrill and R. J. Benzing, of the Wright Air Development Division of the U.S. Air Force (WADD), described the work that is being conducted.

Certain results, they said, have already been applied in military programs.

One technique that looks particularly promising is that of solid-film lubrication.

In this process, a "pigment," such as graphite or molybdenum disulfide, is applied to the metal surfaces by means of a binder such as an epoxy or a phenolic resin, a metal matrix, or a ceramic.

The metal surfaces must be carefully prepared: A roughening process —accomplished with a grit-blast or a vapor-blast—or an iron or manganese phosphate application is required to make the substrate ready to receive the lubricating film.

Solid-film lubricants available today have been tested, and most of them have proved to be inadequate under certain conditions of extreme environment.

WADD and the Midwest Research Institute have been screening the solid-film lubricants commercially available.

Those that seemed promising were then submitted to extreme environment tests.

Special testing machines are used for this work. They can be operated inside enclosures where extremely high or low temperatures, or a hard vacuum, can be maintained.

The tests have shown that drastic changes in wear life of the films occur when the operating temperature increases substantially.

The temperatures selected for the preliminary screening ranged from 400F to 550F. The speed of the testers was 80 to 130 ft. per minute, and the load to which the samples were submitted varied from 400 to 700 psi.

The tests showed that the wear life was reduced by as much as one-half when the temperature was raised from 400F to 550F.

When tested at the temperature of liquid nitrogen (—320F), the wear life of commercial film lubricants showed a decrease of from 85% to 95% from their room-temperature values.

Little difference was noticed between the performance of the various commercial film lubricants tested.

The mechanism of failure used as criterion was the rupture of the bond between the metal and the lubricating film.

However, WADD indicated, during tests conducted previously by the National Aeronautics & Space Administration, exceptionally good lubricating properties were displayed by polytetrafluoroethylene (Teflon) at liquid nitrogen temperature. In these tests, however, the loads were lighter than in the WADD tests, even though the sliding velocities were relatively high.

Nuclear radiation had very little effect, in general, on the wear life of solid-film lubricants, according to tests by both WADD and MRI.

Their corrosion resistance, fluid resistance, and thermal stability are not significantly affected by nuclear radiation either, WADD reported. The samples were irradiated at the Atomic Energy Commission's materials test reactor at Idaho Falls, Idaho, then returned to the WADD laboratory for evaluation.

Both gamma ray and neutron exposures were studied.

Hard vacuum has a deteriorating effect on solid-film lubricants, MRI found. The tests were carried out under a vacuum of 10^{-6} mm. of mercury. Full details have not yet been made public, but MRI has said that solid films outperform liquid lubricants and greases, which are limited in their applications in vacuum due to their high vapor pressures.

In the study of high-temperature applications over 22,000 compounds were screened, and only 60 retained as possible pigments for extreme environment.

Of the initial quantity, MRI found some 1,500 materials that had melting points over 1,000F, and from these 60 were selected after screening. Greatest difficulty seems to be to discover materials having consistently low coefficients of frictions at all temperature levels.

The most promising film developed to date has been a lead sulfite pigment bonded to the metal with boron oxide.

But although this $PbS\text{-}B_2O_3$ combination is satisfactory at high temperatures, it has limitations at normal temperatures, says WADD.

High-ethylene, low-propylene . . .

Copolymer Makes Good Rubber

Development of a new ethylene-propylene rubber, known as EPR, is being pushed actively in the U.S. and in Europe. It is said to have outstanding qualities when compared with most of the conventional synthetic rubbers.

Lyle Amberg, of Hercules Powder Co., described the work done by his company on EPR at the annual meeting of the American Chemical Society, in New York last week.

Among the qualities of EPR, Amberg indicated, are:

- Outstanding ozone resistance;
- Better aging and weatherability;
- Good abrasion resistance;
- Chemical inertness;
- Elasticity at least equal to that of other synthetic rubbers;
- Great resistance to discoloration;
- Lighter density: 0.87 against 0.97.

This should make EPR rubber valuable for many uses, Hercules feels, such as for tires, conveyor belts, shoe soles and heels, and wire coating.

One company that uses large quantities of rubber for wire insulation looks forward to the commercial production of EPR with great anticipation. It has tested it, and plans to use

it either alone or with a reinforcement of nonlinear polyethylene.

Montecatini S.A. had announced previously its devolpment of an ethylene-propylene copolymer rubber, designated as C-23, with properties "comparable to those of natural rubber." Hercules, more conservatively, compares the properties of its EPR to those of SBR—styrene-butadiene.

The new rubber is a high-ethylene, low-propylene copolymer.

Vulcanization, Hercules found, is more difficult when the propylene content is high.

The final version of the new rubber is likely to contain 30% to 40% of propylene. The Mooney viscosity of this product at 212F is around 30 to 45; its "reduced specific viscosity" (or melting index, which is related to its molecular weight) is ⅔ to 4.

The viscosity breakdown of EPR during milling time is substantially lower than that of SBR. After milling for 6½ hours, Amberg reported, EPR had lost only 14% of its original Mooney viscosity; SBR-1,500 lost 65% of its viscosity under the same milling conditions.

But this, Amberg said, may be only a mixed blessing: It makes it difficult to correct, by milling, minor manufacturing deviations. Peptizing agents also have little action upon reducing the viscosity of the EPR.

Vulcanization of EPR can be accomplished with most peroxides, in combination with sulfur, if desired. Hercules uses one of its own products, dicumyl peroxide, as curing agent.

Carbon black has apparently the same action on EPR as it does on SBR: It increases tensile strength and modulus, decreases break elongation.

Plasticizers and oil can be used to extend and modify EPR.

Clays, oils, and a great variety of resins can be used to extend EPR, or to give it added desirable properties. When it is oil-extended, Amberg indicated, the properties of the copolymer vary with the percentage and the nature of the aromatic portion of the oil used.

One possible drawback to use of EPR is its permeability to air.

In tire applications, for example, it is necessary to use an impermeable liner, such as butyl rubber. (EPR does not bond directly to conventional rubbers, but butyl is an exception.) Butyl-base tie gum must also be resorted to when SBR is used for retreading.

Many leading oil companies engaged in the production of elastomers are working at present on the development of ethylene-propylene copolymers.

What's New / IN PROCESSING

Du Pont is marketing a new additive, in addition to TEL and TML, which combines those chemicals and mixed methyl-ethyl-lead compounds.

Tests showed that, on a lead metal weight basis, Tetramix, the new additive, appears to work better than tetraethyl or tetramethyl lead at all concentrations.

However, as is the case with TEL, the effectiveness of the new additive varies with the composition of the gasoline.

•

The first hydrocracking unit using UOP's Lomax process is being constructed at Powerline Oil Co.'s 15,000 b/d refinery at Santa Fe Springs, Calif. The process will be in operation early in 1961.

The unit has been designed to produce about 115 volume per cent of gasoline from straight-run diesel oil and heavy thermally cracked naphtha stock. Beside converting light distillates to gasoline, the process can change other distillates—from kerosine to heavy vacuum gas oil—into either gasoline or a combination of gasoline and middle distillates.

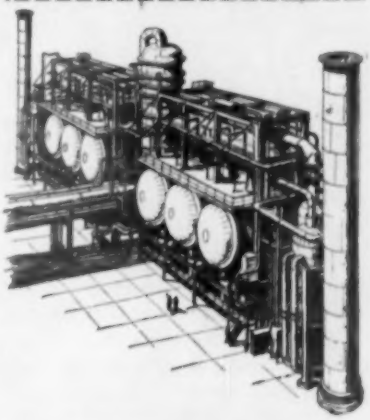
Powerline says the process will increase its gasoline production without further stimulating production of heavy fuel and diesel oil.

•

New facilities to improve the quality of gasoline and mid-barrel products go on stream at Union Oil Co. of California's Los Angeles refinery in December. New units built as a part of a $17-million product quality program include a reformer which will supply hydrogen to three Unifining units for the treatment of stocks of various grades.

on stream in Japan

another HOUDRY DEHYDRO PLANT



Japan Synthetic Rubber Co., Ltd. Yokkaichi, Japan

This versatile installation is the first butadiene plant in Asia. It is designed to accommodate a wide variety of feed stocks ranging from straight run butane to complex mixtures from steam cracking operations. Design capacity is 25,000 ton/yr of butadiene from butane.

Houdry Dehydrogenation Catalyst is used in the reactors, which are arranged in two parallel systems. Either system of reactors can be operated independently of the other.

By direct dehydrogenation of butane, the Houdry Dehydrogenation Process can produce butene as well as butadiene, and produces other mono- and diolefins from the corresponding saturated hydrocarbons. Complete process description available on request.

*HOUDRY
PROCESS CORPORATION
1528 Walnut Street, Philadelphia 2, Pa.
**Houdry means Progress . . . through Catalysis*

Sahara Oil Prices: Variety of Formulas

(A Report from PETROLEUM WEEK'S *Paris Bureau)*

PARIS—The cut in Middle East crude price postings will result in a variety of actual sales prices of Algerian crude to international majors established in France.

Under contracts previously signed with SN Repal—French government-controlled producing company—the basic price for Hassi Messaoud crude was $2.77 per bbl., less a 15¢ discount. Escalation clauses provide for a drop if Middle East prices go down. Freight is tied to the AFRA (average freight rate assessment) scale for large vessels. Since the AFRA reduction July 1, the basic price for Hassi Messaoud crude had been lowered 3¢, to $2.74.

Thus, until the Middle East price cut, all French affiliates of the international majors were paying $2.59 per bbl.—$2.77 base, minus 3¢ AFRA drop, minus 15¢ discount.

The price for each major is likely to be different now, because each had made its own choice of escalation clause, method of price calculation, and crude to be used as a basis for comparison, in negotiating contracts.

For these reasons, the new reduced prices may differ for each buyer by as much as a few cents per barrel, after the effects of the Middle East reductions are calculated.

SN Repal is currently going over the question with the buyers. But new prices are likely to be kept secret, since no company will want to disclose which pricing formula it had chosen.

Prices for crudes from the Algerian Sahara fields that will go into production next month near Libya will be below those for Hassi Messaoud oil by around 6¢ a bbl.

When the base price for Hassi Messaoud crude was $2.77, a price of $2.71 or $2.70 was planned for crudes from the Edjele and Zarzaitine fields of Creps, the French company in which Shell has a 35% interest.

A 15¢ discount will also be given, and again escalation clauses in contracts with majors are expected to vary from company to company. Eventually, this may lead to different prices for each taker here as well.

Informed sources in Paris expect that prices for Edjele and Zarzaitine crude will be posted soon, probably at the same time that a new Hassi Messaoud posting is made to replace the one withdrawn after the cuts in the Middle East.

Sahara Crude Buying: Current Status

Buyer	1960 From SN Repal	1960 From RAP	1961 From SN Repal	1961 From RAP	1962 From SN Repal	1962 From RAP
	(in thousands of barrels per day)					
BP	16.6	2.0*	23.0	20.0*	28.0	17.0*
Mobil	7.0	1.5	7.0	7.0	8.0	8.0
Shell	30.0	7.5	10.0	30.0	5.0	40.0
Esso	7.8	2.0*	19.5**	6.5**	22.0**	8.0**
Gulf	2.2*	?	3.2*	3.0*	3.6*	?
CFP	----		20.0		20.0	
Totals	**76.6**		**149.2**		**159.6**	

*Not firm. **Subject to switch of sellers. See text.

At present, the captive market provided by the majors in France is being divided up by the two French government-controlled Sahara producers so that each will sell an equal share of its production. Both companies, in fact, expect to sell virtually all their crude this year, and about 80% in 1961.

One is SN Repal which has a 50% interest in Hassi Messaoud. The other is Regie Autonome des Petroles, which controls 65% of Creps' production.

The division has an advantage for the international companies buying the crude, as well as for SN Repal and RAP as sellers.

The buyers, for their part, can choose among the three crudes available, the type most suited to their refinery needs—Hassi Messaoud and Zarzaitine are similar high-gravity crudes; Edjele is heavier—while complying with the French government's request that they buy oil from the companies it controls.

For the French producers, the division eliminates an advantage held by SN Repal—which got a head start on Sahara production last year—and puts RAP on an equal market footing, though it won't start exporting Sahara crude until next month.

Most of the majors established in France have either already signed contracts with, or made some commitment to, both SN Repal and RAP (table).

So far, prospective purchases total about 76,600 b/d for 1960; 149,200 b/d for 1961; and 159,600 b/d for 1962. These include some commitments or estimates that were not yet firm as of last week. Firm contracts have been signed with SN Repal by Esso Export, Mobil, Shell, and British Petroleum and with RAP by Mobil and Shell.

Some of the prospective purchases are subject to switch from SN Repal to RAP. Esso Export's contract with SN Repal, for instance, has been amended to provide for switching about 4,000 b/d in 1961, and 6,000 b/d in 1962, with equivalent decreases in Esso's 19,500 b/d and 22,000 b/d purchases from SN Repal in those years.

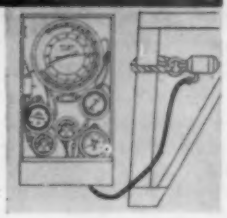
Caltex—now closely tied to French government producers—is also expected to buy some Sahara crude from them, but its arrangements will differ from those of the other majors in France.

Caltex is now formally associated with the government-controlled producers through Union Industrielle des Petroles. This is the joint company just set up to operate the 60% interest the French producers bought in Caltex's French refining, distributing, and maritime transport facilities as an outlet for their Sahara and other French African production (PW—Sep.16'60,p52).

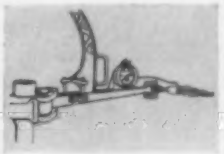
Caltex itself will probably buy about 5,000 b/d of Sahara crude from SN Repal this year, and negotiations may

TONG TORQUE

THE MARTIN-DECKER TONG TORQUE ASSEMBLY FOR ALL CONNECTIONS



PERMANENT INSTALLATION The cylinder attached to the back-up line provides torque indication each time collars are run.



PORTABLE INSTALLATION The torque assembly attached to the tong itself can be used for spot checks on two or more rigs.

ONE GAUGE for torque measurements of all size drill collars, drill pipe, tubing and casing.

ACCURATE AND RELIABLE readings with calibration checks seldom required.

CARE AND MAINTENANCE can be capably done by the drilling crews.

MARTIN DECKER

WRITE FOR DESCRIPTIVE LITERATURE
MARTIN-DECKER CORPORATION
3431 CHERRY AVENUE, LONG BEACH 7, CALIF.

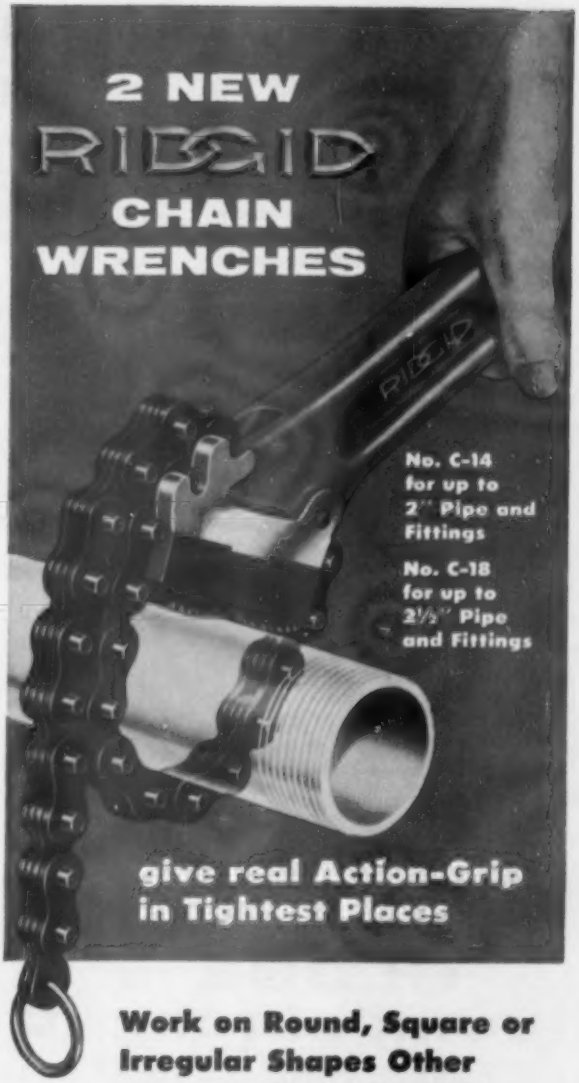
World's principal manufacturer of Oil Well Drilling Instrumentation

OIL LOANS ANYWHERE

'that's the OIL bank for my money!"

DENVER U.S. NATIONAL

DENVER U.S. NATIONAL CENTER Denver 17, Colorado
Member Federal Deposit Insurance Corporation


2 NEW
RIDGID
CHAIN
WRENCHES
No. C-14 for up to 2" Pipe and Fittings
No. C-18 for up to 2½" Pipe and Fittings
give real Action-Grip in Tightest Places

Work on Round, Square or Irregular Shapes Other Wrenches Can't Reach!

In extra close quarters, there's nothing that'll beat these new RIDGID Chain Wrenches for getting the job done. Fast, ratchet-like action in either direction . . . from either side. Give tight grip without crushing. Large, easy-to-grab end ring for fast chain adjustment. Tempered steel chain locks securely . . . releases quickly. Rugged, comfort-grip, I-beam handle, guaranteed not to break or warp . . . handy hang-up hole.

Light and easy to use, these new RIDGID Chain Wrenches do everything a regular wrench can do . . . and much more. Call your Supply House and get one today!

RIDGID

The Ridge Tool Company • Elyria, Ohio, U.S.A.

lead to a long-term contract, or simply to a gentlemen's agreement.

From RAP, it will probably buy 2,000 b/d this year, with tonnages for following years to be arranged by general agreement with the group of producers in Union Industrielle.

France's own international major—which has its own interest in Sahara production—has agreed also to buy crude from the government-controlled producers under two separate contracts.

The company—Cie. Francaise des Petroles—agreed to the move in exchange for government permission to expand its marketing outlets in France by buying Ozo, an independent marketer-refiner (PW—Jun.24'60, p106). CFP itself has a 50% stake in Hassi Messaoud production.

So far, CFP has signed one short-term contract for purchase of 20,000 b/d in 1961 and 1962 from the government producers in the Sahara.

Additional purchases, under a long-term contract, are currently being negotiated by CFP and Ozo together. There is no indication yet how big the total will be, but in 1961 and 1962, RAP's share of the two contracts may be around 20,000 b/d, and SN Repal's 12,000 b/d.

Shell Makes Turkey Find—Country's Second This Summer

ANKARA—After four disappointing years, oil exploration in Turkey is looking up—with the second promising discovery in three months reported last week by Shell.

From the time exploration got under way in 1956 until early this summer, some 40 wildcats were drilled by non-Turkish companies.

There was only one discovery, the Kahta find brought in by American Overseas, owned jointly by California Standard and Texaco (PW—Oct.17 '58,p50). But the crude was very heavy (10-11-gravity).

The only other established production, from three small fields in southwestern Turkey, is in the hands of the government's Turkish Petroleum Co.

Because of the discouraging results, Esso, for instance, recently reported it was giving up in Turkey after spending some $20-million and drilling 11 wildcats.

The new Shell find is in southeastern Turkey, about 30 mi. northeast of the city of Diyarbakir.

The well produced 22 bbl. of 38-gravity crude on a 108-minute test from a depth of 5,798 ft. Drilling is continuing, to a projected total depth of 9,800 ft.

The other discovery of recent months was Mobil Oil's No. 1 Bulgurdag. After treatment, it tested at the rate of 1,200 b/d of 38-gravity crude from 4,700 ft. The discovery is located in the Adana region of south-central Turkey.

At present, Mobil is drilling a second test, the No. 1 Cakit, nearby.

Meanwhile, Shell has abandoned what had originally looked like a promising test in Thrace (European Turkey).

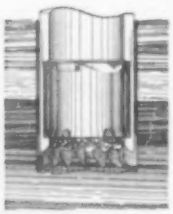
The No. 1 Kuleli wildcat had aroused hopes early this Summer when tests produced irregular oil and gas flows from 8,850 ft. A Kuleli stepout has also been abandoned as dry.

Shell is in partnership with the German firm, Deilmann, in the Thrace venture, but operates alone in the southeastern concession.

IN OVERSEAS OPERATIONS...

GLOBE MODEL "N" JUNK CATCHERS

ARE AS VITAL AS A VISA!



Globe Magnet type catcher. Circulation flows between basket head and magnet.

Both the upper and lower catcher dogs serve to hold ANY load securely while coming out of the hole.

...and it's the only Junk Catcher with interchangeable Magnetic and Dog Type Catchers.

Wherever you may be—from here to breakfast—you'll find that the Globe "Model N" is the standard Junk Catcher for the industry. It's a fast, dependable fishing tool so simple in design, construction and operation that any crew can run it with complete assurance of full recovery of all types of loose junk.

The Globe Junk Catcher uses both a magnetic or dog type catcher—and each is interchangeable so that only one complete outfit is required. Operators appreciate the maximum flexibility in operation and recovery with a minimum of equipment and investment.

Why don't you investigate the advantage of this low cost "insurance" on your next job? Write for descriptive literature.

GLOBE OIL TOOLS

GLOBE OIL TOOLS CO.

Main Office and Plant: LOS NIETOS, CALIFORNIA

Branches maintained in all principal drilling areas

Pemex Offers Deal for Bolivian Crude

(From PETROLEUM WEEK's Mexico City Bureau)

MEXICO CITY—Mexico's Pemex is holding out hopes of a new 50,000 b/d market for Bolivian crude in Mexico in an oil-aid deal offered to Bolivia's government oil company.

Preliminary talks on the proposal for economic cooperation have just been concluded with Bolivian oil officials in La Paz by Pascual Gutierrez Roldan, head of Mexico's nationalized oil agency.

Pemex proposes helping Bolivia's YPFB to boost production of its light crude so that Pemex can buy it for use in a refinery projected for Mexico's west coast, a top Pemex official told PETROLEUM WEEK in Mexico City last week.

Pemex, he said, feels that the light Bolivian oil—which ranges up to 59-gravity—could be mixed with Mexico's heavier crudes to feed the plant.

The Bolivian crude, produced in the southeastern part of the country, would flow through an existing pipeline to the Chilean port of Arica. From there it would be shipped up the Pacific Coast.

Pemex offered to buy up to 50,000 b/d of the Bolivian crude—when and if production could be boosted sufficiently.

At present, Bolivian output totals about 10,000 b/d, most of it produced by YPFB—which is not a monopoly company. Of the total, 2,000 b/d is currently exported to Argentina at a price of $2.70 per barrel.

To develop the production, Pemex and YPFB have discussed a plan to form a mixed company with majority Bolivian interest. Both governments are studying this plan and expect to reach a decision before the end of the year, the Pemex official said.

While Bolivia has a constitutional bar against foreign government oil companies, the provision apparently would not be invoked in this case—as it was against Brazil's Petrobras—because the deal would apply only to the zone specifically reserved to YPFB, which is free to make special contracts in that area.

For this joint venture, Pemex said it would agree to line up credits in Europe and elsewhere for YPFB, which has been hard-pressed for financing.

Pemex itself has a good credit rating in the European Common Market countries and with U.S. banks.

While Pemex officials have hopes of signing the deal by year's end, the only concrete result of the talks so far is that Mexican technicians will be sent to Bolivia.

Pemex said in Mexico City last week that "geological teams" were being sent now. According to information in La Paz, however, the Bolivians were expecting only four experts.

The approach to Bolivia was the first concrete step to implement the aims of Pemex's president to "coordinate" Latin American government oil companies in a mutual trading and technical exchange block.

In its initial move in this direction, Pemex had drawn little response to its call for a Latin American oil parley earlier this year (PW—Apr.15'60, p61).

It remains to be seen whether the talks with Bolivia will actually result in anything more than an interchange of technical personnel.

Heralding
Thompson of FIRST
Sir Elmo—the Banker's Banker!
This light-hearted crest tells you that law-oil-banking is the business career of Elmo Thompson, First National President. Elmo is one of many at First with direct experience in the petroleum industry; men who understand your needs, your problems, speak the language of oil. And you'll find one of the nation's largest oil credit files, and one of the oldest oil departments in American Banking. Visit us.
Think...
1st
of Tulsa
FIRST NATIONAL BANK AND TRUST COMPANY
SINCE 1895

What's New / AROUND THE WORLD

Not Quitting Yet, Cities Service Says

DHOFAR—Cities Service says it isn't ready to give up on exploration in Dhofar yet.

A spokesman last week flatly denied a report from the Middle East that the company has already decided to terminate all exploration and pull out. He pointed out that it is currently drilling one wildcat and has a seismic crew working. So far, it has failed to establish commercial production on the 32,000-sq. mi. concession it holds jointly with Richfield.

•

TUNISIA—An Italian-Tunisian refining company has been formed here by Italy's ENI under terms of the latter's recent concession agreement (PW—Jun.17'60,p66).

The new firm—Stir—will build a $14.4-million, 20,000 b/d refinery near the port of La Skirrha, terminus of a crude pipeline from the Algerian Sahara. The plant is slated to go on stream in 1962.

•

LIBYA—Mobil Oil will soon become the first company to spud a test in Libya's remote Oil Zone 3, the southern section of Cyrenaica Province. The company is readying a test in its block 72 concession, in an area where exploration has only recently got under way.

•

CONGO REPUBLIC—Spafe has started production in its Pointe-Indienne field, first in this republic, formerly the French Middle Congo. The field has a capacity of about 2,000 b/d.

•

ALGERIA—Sinclair is drilling the first wildcat under a new joint working agreement among three groups that also include Phillips, Cities Service, and Newmont Mining.

The test is being drilled on a structure that straddles three adjoining Sahara tracts about 50 mi. southwest of the Hassi Messaoud field. The permits, shared by the U.S. firms with their respective French partners, are Daiet Remt, El Morr, and Hassi El Hadjar.

•

SAUDI ARABIA—Oil output dipped in August to the lowest point since last October. The month's 1,159,709 b/d average, however, was well above August, 1959. The year's average to date remains at record levels.

•

VENEZUELA — President Romulo Betancourt announced last week he may send a mission to Moscow to discuss Russian oil price policies. He gave no indication of when this step might be taken by Venezuela, which has been considering resumption of diplomatic relations with the Soviet Union.

In a nationwide broadcast, the president said Oil Minister Juan Perez Alfonzo—who has already mentioned the proposed step—may visit Moscow to talk about Russian offers of oil at prices below the world market to such countries as India and Ceylon (PW—Sep.16'60,p52).

•

UNITED KINGDOM — Britain's state coal industry is armed with a new tariff that will help fight any spurting competition from oil as it hikes coal prices this week for the first time in three years. The tariff provides for negotiating coal prices below the new standard rates in regions where competition from oil is particularly keen.

•

VENEZUELA — Venezuela's Petroleum Industry Chamber has reelected as president Dr. J. A. Giacopini, a director of Shell of Venezuela. Also reelected: as vice-president, Dr. Luis Alcala Sucre, of Mene Grande Oil Co., and as treasurer, E. E. Massimine, of Paria Operations Inc. General secretary is Dr. Amos Pifano.

•

MOROCCO—The Moroccan government plans on investments of $56-million in oil exploration and development under a new Five Year Plan starting in October. The total, it announced, includes both state and foreign capital that will go into an intensified expansion program.

•

PAKISTAN—The way to export of Pakistan natural gas to India may be smoothed now that the two nations have settled their dispute over use of Indus River waters.

A deal for export of Pakistan gas from Burmah Oil Co. and Stanvac fields has been linked by officials here with the successful conclusion of the Indus treaty, which was signed this week.

•

ARGENTINA—YPF, the state oil agency, is expected to place orders for three 25,000-ton tankers in Spain for transport of its increasing oil production. Preliminary agreement has been reached with Spanish shipbuilders in Bilbao, sources there reported last week.

•

ALGERIA—German companies are already increasing their exploration

BP Swiss Test

A Swiss farmer drives his ox-powered wagon past a British Petroleum rig, apparently unconcerned by the oil company's search for a more modern source of energy.

This BP test is being drilled near the town of Courtion, 10 mi. northwest of Fribourg City in the canton of Fribourg. The Swiss flag flies at top of the rig.

stakes in the Sahara, where they have just appeared for the first time in the latest round of grants (PW—Sep. 16'60,p50).

In a new move last week, one of the German newcomers—Wintershall AG—and Preussische Bergwerke & Huetten AG each took a 25% interest in the hitherto unexplored two-year-old Tindouf permit held near the Morocco border by the French government-controlled Safrep.

•

QATAR—Shell has spudded the first of the new offshore tests planned to evaluate the commercial prospects of oil shows encountered this summer in the third wildcat on its Qatar offshore concession. It still isn't talking about the results of testing in the No. 2 Idd El Sharqi, which had shows in the middle Jurassic at a site 52 mi. east of Qatar peninsula.

•

UNITED KINGDOM—British Petroleum is making a bid to expand its exploration and production stakes in Trinidad and Canada. It announced it has made an offer for all issued share capital of British-owned Apex (Trinidad) Oilfields Ltd.

Apex produces about 8,000 b/d in Trinidad, where it has 64,175 acres of oil rights. It also has a 25% interest in Canpet Explorations, which holds about 1.7-million acres in Canada with only limited production there so far.

•

SPAIN—Esso and Shell have both been turned down in separate bids to build petrochemical plants in Spain, the government officially announced last week. One reason cited in the official gazette is that it has already granted such rights to two other groups.

•

INDIA—The Russians are now said to have pegged their 25% discount prices for product sales to India to Persian Gulf postings prevailing at shipment time from Russian ports.

Their contract terms for a total 1.5-million tons over three years have never officially been disclosed.

Up to this point, they were generally believed to be based on a fixed price for a fixed quantity.

•

VENEZUELA—The Oil Ministry says sales of oil at "abnormal" discounts are being blocked as a result of investigations by its Coordinating Commission for Conservation & Marketing. So far, the ministry reported last week, the commission has held talks with 13 companies.

•

LIBYA—The World Bank has recommended a $70.2-million five-year development plan for Libya to be financed, in part, by expected oil revenues.

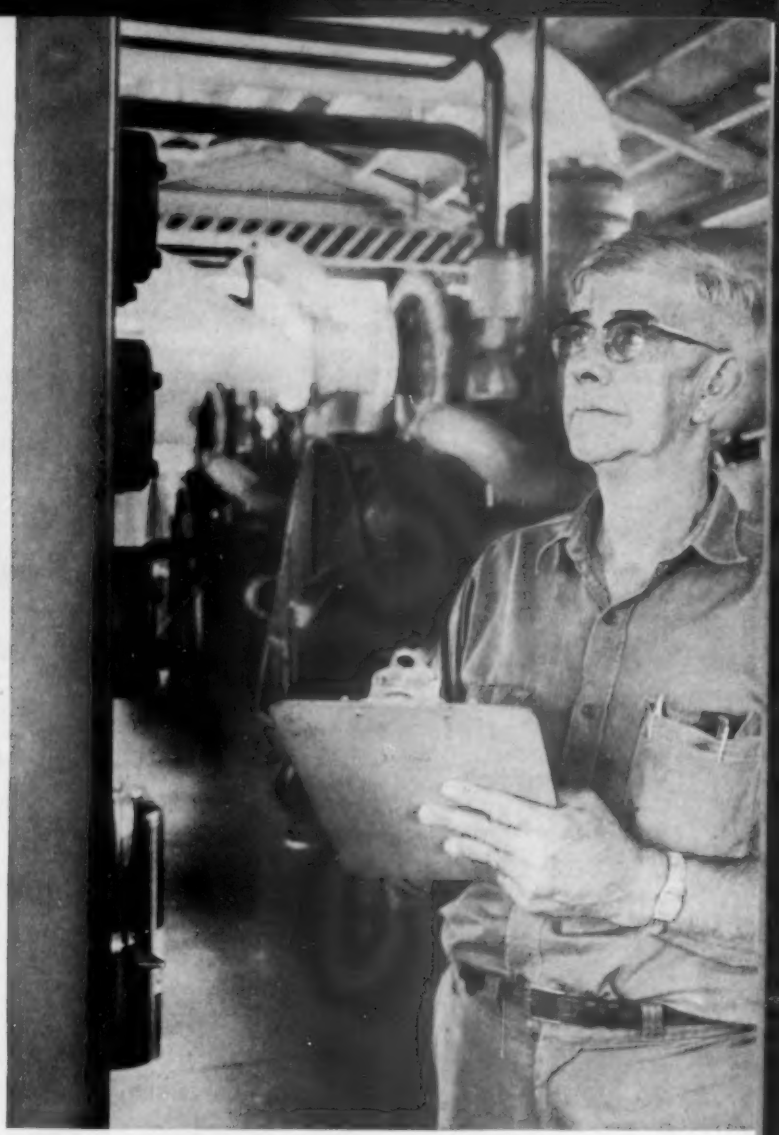
No large increases in revenues from oil production are visualized before 1965, a bank study commission said, though it based its proposal on the possibility that some oil revenue would be available earlier.

•

USSR—The first section of eastern Siberia's first refinery has gone into operation at Irkutsk, according to reports in Moscow last week. Crude from Bashkiria will be brought in by rail tank car until next year, when a pipeline from Tuimazy is completed.

Under and above the sea..
Protection!
OFFSHORE OIL INSURANCE
From the top of the rig to the bottom of the hole, offshore oil drilling and production calls for experienced specialists—no less in the area of your insurance coverage than in any other. Your insurance agent or broker knows that Southern Marine has specialized in arranging proper coverage for offshore drilling and production equipment since the earliest days of offshore exploration, and that we know too how much prompt and proper servicing of losses can mean to you. Ask him about Southern Marine know-how and service.
SOUTHERN MARINE
& AVIATION UNDERWRITERS, INC.
610 Poydras Street, TUlane 5266, New Orleans 12
L. K. GIFFIN, President

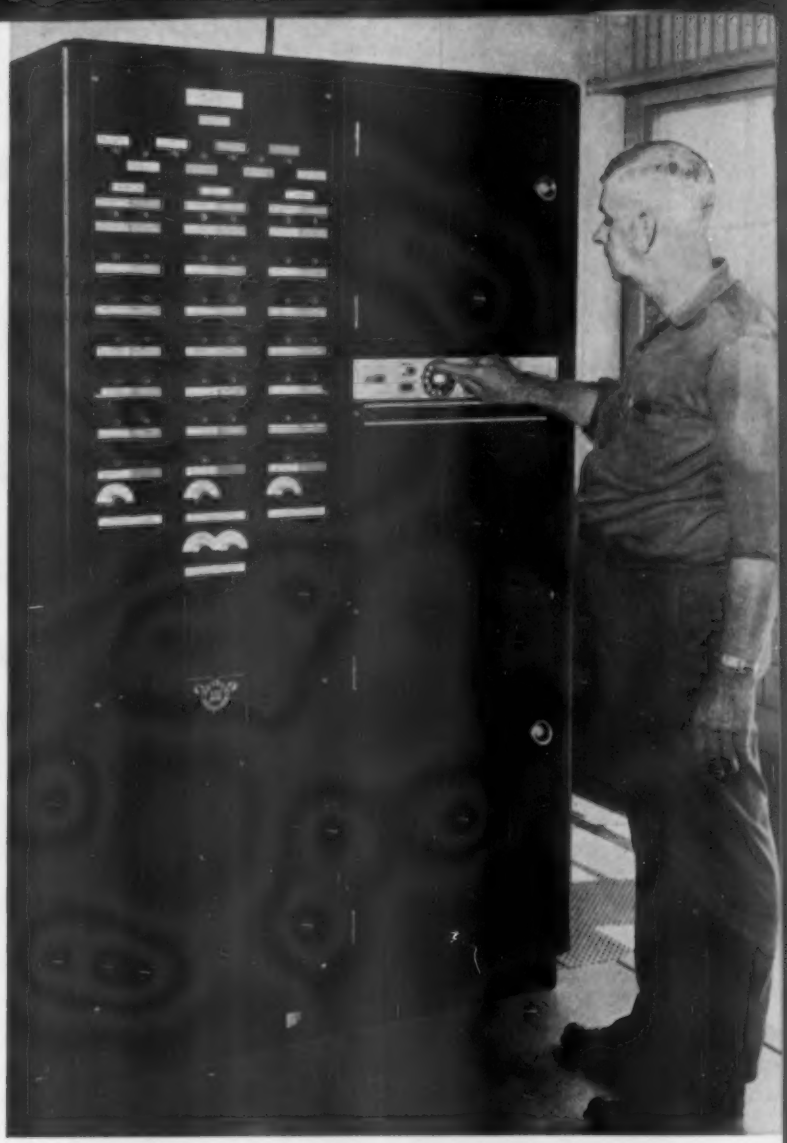
At Crawford Station: En-Tronic Control actuates all functions at McArthur Station and records engine speeds and pressures. Shown here: W. E. Deeds, Engineer in Charge.



At McArthur Station: James Caldwell, Chief Engineer takes a reading from the En-Tronic Control of one of the Cooper-Bessemer compressors. This control actuates starting sequences and monitors the complete operation.

How Cooper-Bessemer equipped McArthur

TO START OR STOP McArthur Station's 1100 hp Cooper-Bessemer compressors, they simply dial a number. This storage field station of Ohio Fuel Gas Company is fully automatic, day and night... controlled from their Crawford Station 34 miles away by Cooper-Bessemer En-Tronic Controls. They start and stop the three GMVA Compressors... record engine rpm, discharge and suction pressures, and gas



At McArthur: This En-Tronic Control is a telemetering and supervisory control unit for the entire operation. Compressors can be started or stopped from this location as well as from Crawford.

Station operates automatically round the clock

flow... and operate the 20" main valves from the remote station.

Now completing two years of operation, McArthur Station has an impressive record of dependability.

It will pay you to investigate Cooper-Bessemer reciprocating compressors, centrifugal compressors, engines and En-Tronic Controls for *your* expansion and modernization plans. Call our nearest office.

BRANCH OFFICES: Grove City • New York • Washington
Gloucester • Pittsburgh • Chicago • Minneapolis • St. Louis • Kansas City • Tulsa • New Orleans • Shreveport • Houston • Greggton • Dallas
Odessa • Pampa • Casper • Seattle • San Francisco • Los Angeles
SUBSIDIARIES: Cooper-Bessemer of Canada, Ltd.... Edmonton
Calgary • Toronto • Halifax • Stratford
C-B Southern, Inc.... Houston
Cooper-Bessemer International Corp.... New York • Caracas • Anaco
Cooper-Bessemer, S.A.... Chur, Switzerland • The Hague, Netherlands
Mexico City
The Rotor Tool Company... Cleveland

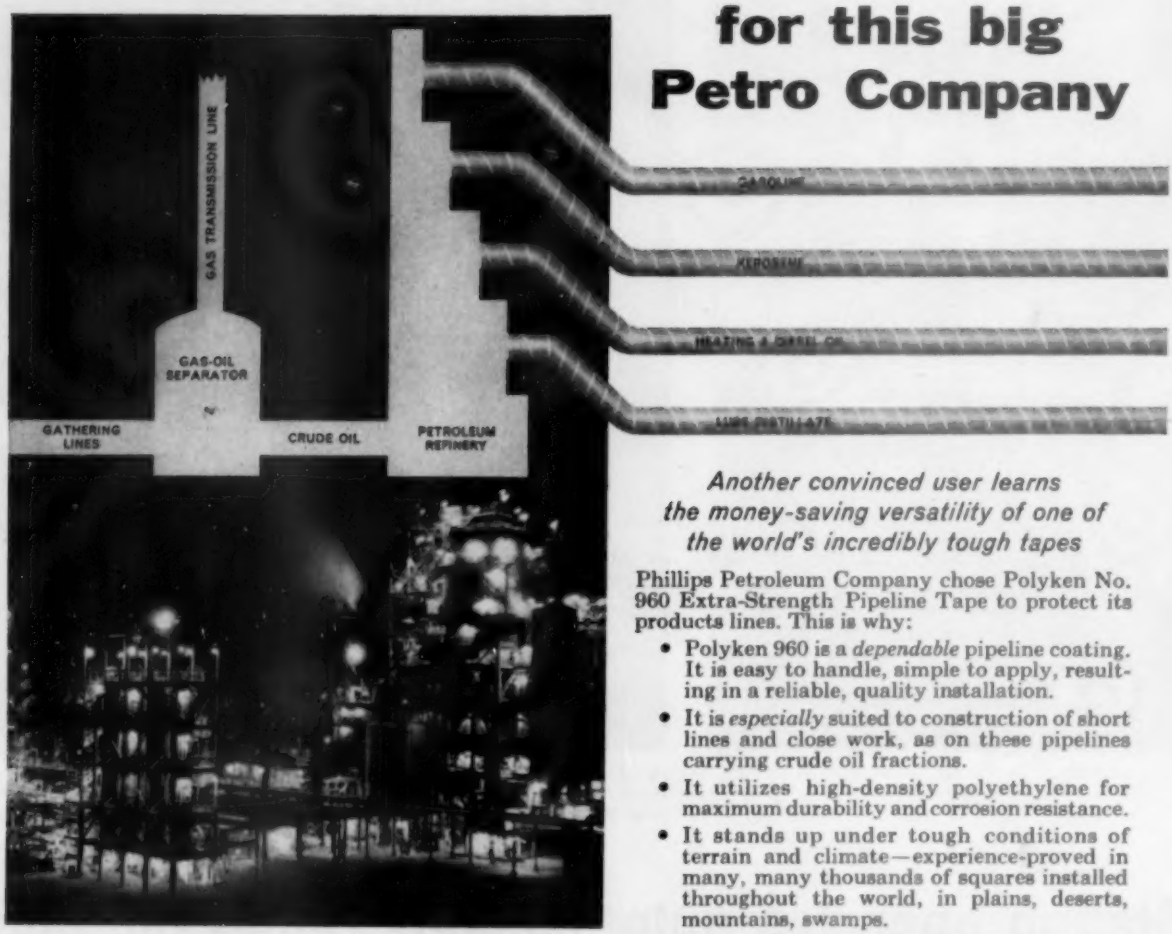
Cooper Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

ENGINES: GAS - DIESEL - GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL,
ENGINE, TURBINE OR MOTOR DRIVEN

Polyken tape protects products lines

for this big Petro Company



Another convinced user learns the money-saving versatility of one of the world's incredibly tough tapes

Phillips Petroleum Company chose Polyken No. 960 Extra-Strength Pipeline Tape to protect its products lines. This is why:

- Polyken 960 is a *dependable* pipeline coating. It is easy to handle, simple to apply, resulting in a reliable, quality installation.
- It is *especially* suited to construction of short lines and close work, as on these pipelines carrying crude oil fractions.
- It utilizes high-density polyethylene for maximum durability and corrosion resistance.
- It stands up under tough conditions of terrain and climate—experience-proved in many, many thousands of squares installed throughout the world, in plains, deserts, mountains, swamps.
- Its cathodic protection requirements are low.

AND . . .

- It saves money: Polyken 960 goes on fast with less men per job, covers more miles per day. Less equipment, less handling costs. More savings over the old hot dope idea.

See your Polyken Man . . . call your Polyken Tape Coating Distributor . . . or write Polyken, 309 West Jackson Blvd., Chicago 6, Illinois.

©1960 The Kendall Company

Phillips pipe is cleaned and wrapped by Brodie Construction Company in a single factory-smooth operation. No primer, no drying or cooling. No fumes or fire hazards.

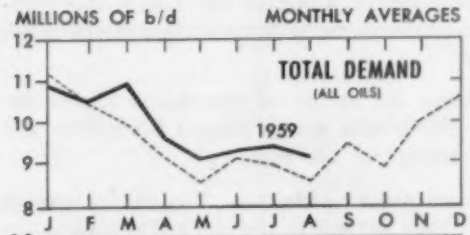
Polyken®

EXPERIENCED IN PROTECTIVE COATINGS

THE KENDALL COMPANY
Polyken Sales Division

PETROLEUM WEEK'S

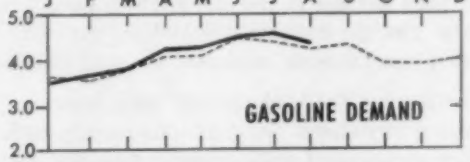
Fingertip Figures



Figures for period ended Sept. 16, except as noted

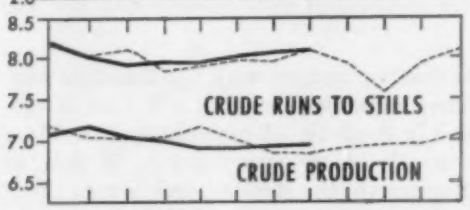
TOTAL DEMAND

Latest 4-week average	9.046
Year ago	8.894



GASOLINE DEMAND

Latest 4-week average	4.424
Year ago	4.344

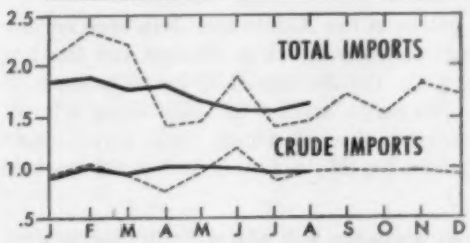


RUNS TO STILLS

Latest week	8.083
Previous week	8.271
Year ago	7.994

CRUDE PRODUCTION

Latest week	6.847
Previous week	6.874
Year ago	6.823

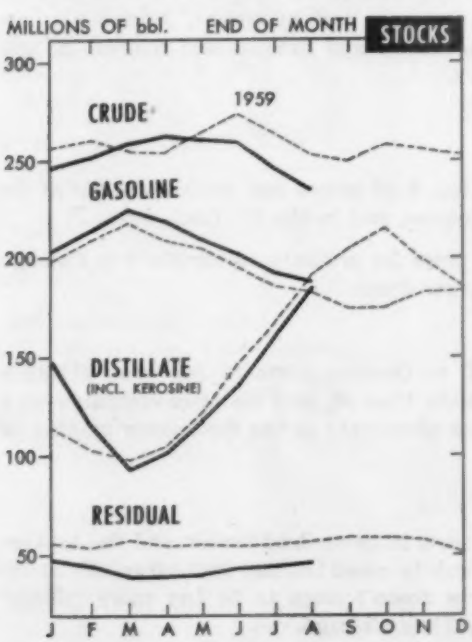


TOTAL IMPORTS

Latest week	1.612
Previous week	1.382
Year ago	1.392

CRUDE IMPORTS

Latest week	1.229
Previous week	.777
Year ago	.919



CRUDE STOCKS

Week-ended Sept. 10	227.8
Previous week	232.6
Year ago	249.0

GASOLINE

Latest week	189.3
Previous week	188.9
Year ago	180.8

DISTILLATES

Latest week	197.5
Previous week	193.6
Year ago	202.8

RESIDUAL

Latest week	47.6
Previous week	47.8
Year ago	58.2

Refinery runs dropped 188,000 b/d last week to the lowest level since mid-June.

Crude throughput averaged 8,083,000 b/d, a marked improvement over the previous week, when 8,271,000 b/d were processed.

It's too soon to forecast whether the downturn is permanent, or whether the statistics will resume their zig-zag pattern.

An interesting note is that the timing coincides exactly with the leveling off of throughput that occurred last year after a month of abnormally high runs.

Logically, the cutbacks in runs to stills announced by various companies should begin to show their effect about now.

Sinclair Refining Co., for example, reports that the company's refinery runs for the nine months ending Sept. 30 will be 2.6% lower than the like 1959 period.

Turnarounds planned by several companies for the next few weeks should also trim throughput down to a healthier level.

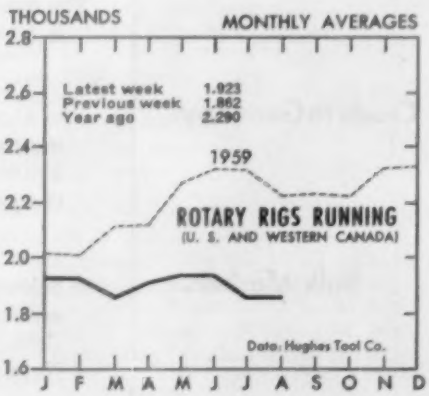
There hasn't been any improvement in the product stocks surplus so far.

Gasoline stocks rose by 459,000 bbl. last week to total 189.3-million, or 8.5-million bbl. higher than a year ago.

Gasoline stocks were still declining at this time in 1959. In fact, the start of the seasonal buildup in motor fuel inventories in late 1959 didn't occur until the first week in November.

Gasoline prices are still firm, with no post-Labor Day sogginess in sight.

In the Midwest, a critical area for gasoline, demand has been bolstered by a peppy farm market. Prices are firm throughout the rest of the nation, too.



The Market Trend

Lots of Contradictions in the Market Place

The market place is full of odd-ball situations that are hard to explain. It's a do-as-I-say-not-do-as-I-do proposition. A typical example of this paradox is propane in the Mid-Continent: Everybody posts 5¢, and everybody's net selling price is closer to 4.5¢.

You'd run out of breath listing the major oil companies who've announced cuts in runs, but the refining rate hangs around 8.2-million b/d nevertheless. Who's right? The cutters or the runners?

The oil banks and the refiners are at odds, too. The banks inveigh against oversupply problems that they say are in the offing. Price disasters may be coming, say the financiers. Yet the refiners are talking strength. Mention a discount to a refiner, and you have an argument on your hands.

The tanker market is alive with what the brokers call "new demand," but ship rates don't seem to be going anywhere. Some charterers are back in the market taking tonnage after absences of up to three years. But you can still find ships cheap.

And nobody's supposed to be trading tankers with the Russians anymore, but the Soviet can pick up charter parties almost at will. Last month, Sovfracht took the Conca D'oro and Iz (both 18,000-tonners) and the Petar Zoranic (a 23,000-tonner) for a year's consecutive voyages. In fact, of eight dirty term charters fixed last month, the Russian took seven.

And the recent slip in crude prices in the Middle East has been accompanied by strengthening in product prices in much of Europe and the Far East. Bunker "C" fuel discounts, f.o.b. the Persian Gulf for shipments to Japan, are negligible right now. The cargo market in Italy—long a weak spot for residual—has turned stronger. Gas oil prices, f.o.b. Dutch ports for shipment to West Germany, rose by 26¢ a ton in the early part of September.

Summing up: Gasoline prices probably will slip a little this season, and heating oil prices will rise. On more certain ground, independent refiners will remain confirmed optimists, and independent marketers will continue to sell out to the majors.

No. 5 Oil Hike: Indiana Standard advanced its No. 5 oil prices last week by 0.25¢ at its Whiting and Wood River refineries, and in the St. Louis area.

The company's new tank wagon price for ordinary-sulfur No. 5 in Chicago is 10.45¢ for 1,500 gal. and larger drops.

Crude to Germany: The average cost of crude c.i.f. to German ports in July was $19.35 a metric ton. Most of this is Middle East oil, and the price compares with $19.90 (about $2.80 a bbl.) for shipments in the first seven months of the year.

Bulk Markets: Wholesale markets everywhere seem to be on dead center, and the brokers are singing the blues. It's difficult to recall the last spot cargo sale at the Gulf. One hopeful note: There doesn't seem to be any more "dump" No. 6 oil (it used to be 6¢ a gal.) in Chicago.

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of September 19

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- Gasoline, 98 oct prem....12.25-13.25
- Gasoline, 92 oct reg....11.25-11.5
- Kerosine....9-10
- Heating oil, No. 2....8.25-9
- Gas oil, 48-52, d.i....8.5-8.875
- Fuel oil, bunker "C"....$2.30

Caribbean, cargoes
- Avgas, Grade 100/130....14.75
- Gasoline, 93 oct research prem....11
- Gasoline, 87 oct research reg....10.125
- Gasoline, 80 oct research....9.375
- Gasoline, 70-72 oct motor method....9.25
- Kerosine....9.25
- Heating oil, No. 2....8.125
- Gas oil, 48-52 d.i....8.375
- Fuel oil, bunker "C"....$2.00

New York Harbor, barges
- Kerosine....9.9-10.3
- Heating oil, No. 2....8.9-9.3
- Fuel oil, No. 6....$2.62

Okla.-Group 3, northern shpt., bulk
- Gasoline, 91 oct reg....12.5-13.25
- Kerosine....10.5-10.625
- Heating oil, No. 2....9-9.25
- Fuel oil, No. 6....$1.80-1.90

Chicago, bulk
- Gasoline, 92 oct reg....12.625
- Heating oil, No. 2....9.5-11.35
- Fuel oil, No. 6 high sulfur....7.65

Los Angeles, rack
- Gasoline, 88 oct reg....11.3-12.65
- Diesel fuel, PS 200....7.75-11.25
- Light fuel, PS 300....$2.80
- Heavy fuel, PS 400....$1.95-2.35

Natural Gasoline, Grade 26-70
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

LP-Gas
- Propane, Oklahoma (Group 3)....4.5-5
- Propane, Baton Rouge....5.625

Pennsylvania Lubes
- Bright stock, 25 p.t....25
- **200 vis. neutral, 25 p.t....28↑**

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i....26-27
- Neutral, solvent, 200-210 vis....23-24

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i....26
- Neutral, solvent, 200 vis....23

Eastern Hemisphere

Singapore (Pulau Bukom) cargoes
- Avgas, grade 100/130....15.5
- Gasoline, 79 oct research....9.125
- Kerosine....9.625
- Gas oil, 48 d.i. minimum....8.75

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, (Okla.-Kan.), 36.0-36.9....$2.62-2.97
- North Dakota, 36.0-36.9....2.47-2.87
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00
  - West Texas, N.M., inter., 36.0-36.9....2.93
  - West Texas, N.M., sour, 32.0-32.9....2.71
  - East Texas, flat....3.05-3.25
  - Mirando, 28.0-28.9....2.96-3.31
- Illinois Basin, flat....3.00-3.05
- Pennsylvania Grade, Bradford dist., flat....4.80
- California, Signal Hill, 21.0-21.9....2.32†
- North Louisiana-Arkansas, 36.0-36.9....2.72-3.02
- Wyoming, sweet, 36.0-36.9....2.85-2.90
- Wyoming, sour, 32.0-32.9....2.63-2.71

Canada (flat prices, at the well)
- Pembina (Alta.)....$2.38
- Leduc-Woodbend (Alta.)....2.53
- Redwater (Alta.)....2.42
- Steelman A (Sask.)....2.44
- Virden (Man.)....2.30

Venezuela (Cargoes, FOB lifting port designated)
- San Joaquin, 41.0-41.9, Puerto la Cruz....$3.10
- Oficina, 35.0-35.9, Puerto la Cruz....2.78-2.80
- Tia Juana, Medium, 26.0-26.9, Amuay....2.30
- Bachaquero, flat, La Salina....1.85
- Tarra, 38.0-38.9, San Lorenzo....2.83
- Lagunillas Heavy, flat, La Salina....2.07

†Differential per deg. of grav. varies

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- **Arabia, 34.0-34.9, Ras Tenura....$1.80↑**
- **Safaniya, 27.0-27.9, Ras Tanura....1.47↑**
- **Iran, 34.0-34.9, Bandar Mashur....1.78↑↓**
- **Iran, 34.0-34.9, Abadan....1.73↑↓**
- **Iraq, 35.0-35.9, Fao....1.72↑**
- **Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.59↑**
- **Qatar, 41.0-41.9, Umm Said....1.95↑**
- N. Zone, Burghan, 23.5-24.4, Mina Saud....1.47
- N. Zone, Ratawi, 23.5-24.4, Mina Saud....1.40
- N. Zone, Eocene, 16.5-17.4, Mina Saud....1.27

Middle East, Eastern Mediterranean
- **Arabia, 34.0-34.9, Sidon....$2.17↑**
- **Iraq, 36.0-36.9, Tripoli, Banias....2.21↑↓**

North Africa, Phillipeville, Algeria
- Hassi Messaoud, 48 and above....Withdrawn

KEY TANKER RATES

(Last paid, per long ton, single voyage)

- **U.S. Gulf-New York, clean..(USMC—10%) $2.56↓**
- **U.S. Gulf-New York, dirty..(USMC—10%) $2.56↓**
- **NWI-USNH, dirty....(USMC—60%) $1.10↓**
- **NWI-UK/Cont., dirty....(Scale—57½%) 14/2*↑**
- **Persian Gulf-UK/Cont., dirty (Scale—50%) 30/8*↑**
- Persian Gulf-USNH, dirty....(USMC—70%) $3.81

**Sterling*

Thin-Wall Pipe Gains Wide Acceptance

American Society of Mechanical Engineers hears report on thin-wall use by 35 companies.

Turbine-type meters are also given high rating because of their low cost and efficiency.

Looking ahead, more powerful, smaller gas compressor engines are seen.

Major cost-saving improvements in pipeline technology highlighted last week's meeting of the American Society of Mechanical Engineers. Most dramatic is the development of high-strength thin-wall pipe.

The society held its 15th annual parley Sunday through Wednesday at New Orleans.

Papers covered improvements in equipment and techniques in most of the important phases of the pipeline industry.

Spurring the technological progress, according to the pipeline men, is the tightening competition in petroleum transportation.

Results of a study of the use of thin-wall (pipe having a wall thickness of .188 in. or less) were revealed by W. P. Heineman, of United Gas Pipe Line Co.

The survey covered 35 companies, which are now using the pipe.

Heineman's conclusion: "Thin wall pipe has found a definite place in the oil and gas industry."

In the case of a 6⅝ in. line, the saving in using pipe of .104 in. wall thickness (American Standards Assn. minimum) instead of .280 in. thickness (standard size made) would amount to $1 per ft.

Actually, Heineman says, a wall thickness of only .085 in. is needed to produce pipe in a diameter of 6⅝ in. with a yield strength of 52,000 psi.

While the savings in installing a line of this wall thickness would undoubtedly be greater, the pipe is not certified.

Pipe in four diameters up to 10¾ in. has been made in a wall thickness of .188 in. with a yield strength of 52,000 psi., Heineman reports.

Other diameters are 4½ in., 6⅝ in., and 8⅝ in.

Stress levels of all four pipes operating at an internal pressure of 1,000 psi. is described as "relatively low."

Stress level is the load in pounds that must be supported by each unit of area.

At 1,000 psi. internal pressure, stress levels of the four pipes are: 11,960 psi. for the 4½ in., 17,680 psi. for the 6⅝in., 22,880 psi. for the 8⅝ in., and 28,600 psi. for the 10¾ in. pipe.

At an internal pressure of 500 psi., stress levels are approximately half.

More care is required in the construction and handling of thin-wall pipe than is needed in the production and handling of heavier wall pipe, because of the greater danger of failure due to defects.

"The importance of good inspection during construction and the insistence on good construction practices cannot be overemphasized," says Heineman.

He adds that most mills today take extra care in producing thin-wall pipe by providing "close inspection to eliminate or minimize manufacturing defects."

He cautions, however, that the handling of the pipe in the field also demands special attention and that "it is well to carefully scrutinize contractors' capabilities prior to placing them on the bidders list."

A defect of a given size—such as a crack—is more critical in the weld of a thin-wall pipe than in the weld of a heavier pipe because there is less metal.

"It is now common practice in most mills to provide some form of continuous nondestructive testing of the weld seam," Heineman notes.

One undisclosed mill, according to Heineman, cold expands all its pipe of a diameter of 12¾ in. and larger, in addition to putting it to nondestructive tests.

Most thin-wall pipe today is electric resistance welded (PW—Feb.19 '60,p76).

A common defect in this type of weld, Heineman says, are pin holes, which are due to the porosity of the weld.

He reports that a good deal of thin-wall pipe is spiral welded, but it has not been classified by the code-making bodies as yet.

Nonetheless, he adds, "Spiral weld pipe has good possibilities for the future."

In the field, sections of thin-wall pipe can be welded at a faster rate than joints of heavy-wall pipe, resulting in a saving in manpower and material, according to Heineman.

"This saving, although not as large as the saving in steel, can be an appreciable amount in a long line," he says.

In laying thin-wall pipe, a common problem is buckling, which can occur during either bending or over-the-ditch coating of the pipe.

The way to prevent buckling in the former operation is to bend the pipe on a larger radius than would be used for heavy-wall pipe, and the remedy in the latter operation is simply to use more tractors to support the line.

Corrosion protection of a thin-wall pipeline must be "of the highest quality," Heineman stresses.

Reason is that there is less steel. Once corrosion starts, it will destroy a thin-wall pipe faster than it will a thicker pipe.

Heineman complains that American Petroleum Institute specifications haven't kept pace with advances in thin-wall pipe.

An example of the lag is API 5 LX specifications, which cover materials with a yield strength in excess of 35,000 psi. The specifications say that pipe made from such materials must have a wall thickness over .188 in.

The fact is that pipe with thinner walls is being made and used, says Heineman, "and therefore it should be contained in the appropriate specifications."

Turbine meters to measure batches of products in a pipeline offer significant initial savings over positive-displacement meters, according to William W. Holt Jr., of Plantation Pipe Line Co.

Cost of a turbine meter capable of measuring 10,000 bbl. of product an hour is less than $6,000, while the cost of a positive-displacement meter

Keeping oil and gas *on the move*

Your Profit-Pipe is LIGHTWALL by SOUTHWESTERN

It gives you heavyweight performance for less money: lower initial cost, ease of installation, flexibility, greater flow-through and long trouble-free service.

SOUTHWESTERN gets your order on the way without delay . . .

keeping oil and gas on the move. We take pride in our fast, dependable delivery from large warehouse stocks. Southwestern makes a full range of sizes up to 4.500" O.D. in wall thicknesses up to .188 wall to meet almost every need and every joint is top performance quality.

Take a look at LIGHTWALL by SOUTHWESTERN...your Profit-Pipe

LICENSED BY THE AMERICAN PETROLEUM INSTITUTE

SOUTHWESTERN PIPE, INC.

P. O. BOX 2002 HOUSTON 1, TEXAS PHONE CAPITOL 4-0631

EXPERIENCED HANDS AT FISHING

The Wilson Supply Fishing Tool man in your area is a good man to know when a fishing job comes up. He's an experienced hand at fishing and has the proper tools to get the job done right for you safely . . . quickly. Save rig time and money when you have a fishing job . . .

call Wilson.

WILSON SUPPLY CO
HOUSTON, TEXAS

6013

MAIN OFFICE & WAREHOUSE • 1301 CONTI • HOUSTON

to do the same job would be over $25,000, he says.

Installation of either meter, he adds, would cost about $5,000.

At the same time, performance of the meters is at least equal to that of positive-displacement units, he intimates.

Plantation Pipe Line's experience with turbine meters dates from 1957, when it installed a test unit at its Baton Rouge (La.) pump station.

Since then, it has installed seven more turbine meters on its system in Baton Rouge and Bremen, Ga., ranging in capacity from 1,000 to 10,000 barrels per hour.

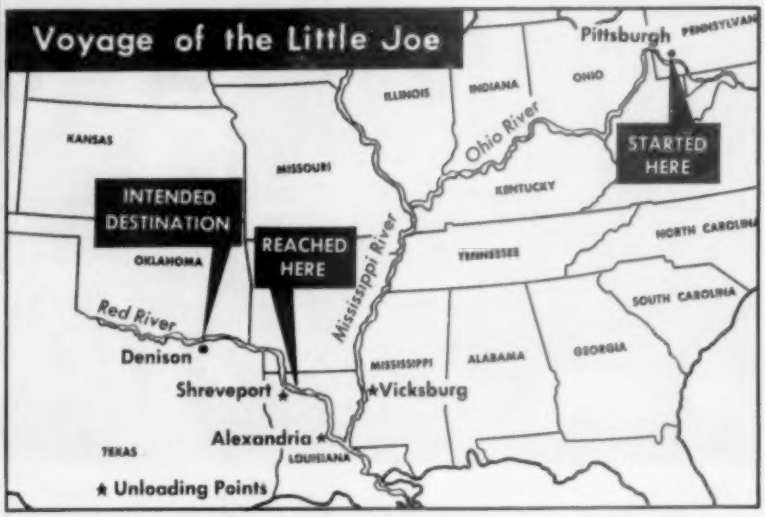
Performance of the meters from a standpoint of accuracy and repeatability is rated as excellent.

In fact, Holt reports, an inspection of the original test meter this July, after it had passed more than 200-million bbl., revealed that bushings and pivots were worn but didn't need replacement.

Key advances are around the corner in the development of more powerful, smaller gas compressor engines, Roy M. Greene, general manager, Turbo-Products Division, Clark Bros. Co., told the meeting.

Greene predicts that in the "immediate future" all such engines will be turbocharged.

The main effect of the turbocharging, Greene says, will be to permit the construction of smaller engines with the same—or greater—outputs than those of existing bigger engines.



Saga of a Paddlewheel Tug

Little Joe, a paddlewheel tug, shooting for Denison, Tex. made Shreveport, La., with an oil barge. Though falling short of its mark, the barge is said to be the first ever to reach that Red River port.

Barney Holland, president of Holland Oil Co., Ft. Worth, says that up to now only packet boats have been able to negotiate the shallow, tricky Red as far as Shreveport.

Moreover, he adds, no vessel of any kind has been brought into Denison with a commercial cargo in 55 years.

Tug and barge, carrying 200 tons of lube oil, set out from Pittsburgh July 9, and their voyage makes a small saga (map).

In over two months on the water, they traveled some 2,500 mi.—first down the Ohio River, then down the Mississippi, and finally up the Red.

At Natchitoches, La., 100 mi. downstream from Shreveport, the barge grounded on a sand bar, and Holland had to send a 200-hp. outboard engine to plow it out.

The grounding occurred even though 54 tons of the cargo had been unloaded at Vicksburg, Miss., and another 18 tons at Alexandria, La.

In addition to the bars, the current was against the tug on the Red. While Little Joe was able to do a jaunty 10 mph. on the Mississippi, it was slowed to little more than 2 mph. on the Red.

Holland's purpose in attempting the trip to Denison was to prove that oil could be barged there cheaper than it could be brought there by other means of transport.

He hasn't disclosed what his costs were to bring the cargo of lube oil as far as Shreveport. But, he says, this

You can move or store almost anything, liquid or dry anywhere on earth in lightweight fold-away new FIRESTONE FABRITANKS

Got a storage or a transport problem? For a cost cutting solution write Firestone!

FABRITANK BY Firestone

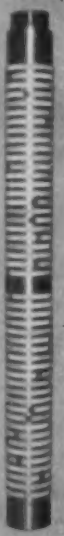
Copyright 1960, The Firestone Tire & Rubber Company

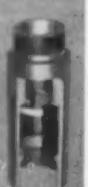
Firestone Industrial Products Co., Firestone Boulevard at 17th Street, Dept. 62-1, Noblesville 2, Indiana
The Firestone Tire & Rubber Co., Coated Fabrics Division, Dept. 62-1, 2525 Firestone Boulevard, Los Angeles 54, California

Let R-u-b-b-e-r Take The Wear

in your sucker rod pumps

IT COSTS YOU LESS THAT WAY





● MARTIN RUBBER & DUCK RINGS give excellent life in dirty abrasive fluids . . . high or low gravity . . . much or little water . . . shallow or deep wells. They last for years in the easier pumping wells. Replacement rings cost comparatively little.

● MARTIN PLUNGER BODIES, precision grooved, drilled and threaded (no underneath fluid passage), usually last for years. Tube or barrel costs are often cut in half.

● The replaceable SYNTHETIC RUBBER GUIDES in MARTIN CAGES last longer than any metal, and the cushioning of the ball increases your ball & seat life. Results are often truly amazing. (Patent No. 2,591,174)

Write for our new 1960 catalog or see it in the new Composite (24th Edition). All products sold thru supply companies.

JOHN N. MARTIN

Manufacturer

S. W. BRADY STREET • TULSA, OKLAHOMA

first voyage was "strictly a pioneering effort."

On subsequent voyages, using a more powerful tug and a barge of shallower draft, Holland expects costs to run at least 10% below those of other kinds of transport.

Holland intends to attempt another run on the Red River this fall, reportedly using a more powerful tug.

In addition to using more horsepower, Holland hopes to be favored with higher water than there was this summer.

Even with these extra advantages, though, the voyage still will be hazardous, since there are no lights or markers on the Red River.

Holland is hoping, however, that his efforts will stir the federal government to develop the Red as an inland waterway, and provide navigational aids.

What's New / IN TRANSPORTATION

Texas-New Mexico R.R. says its 1960 revenues will fall over 50% below last year's unless ICC lifts its 7-month suspension of rail rate cuts proposed to compete with Mid-America Pipe Line Co.

Seventeen roads sought the 21¢-per-bbl. reduction on LP-Gas shipments from the Southwest to the Midwest last week, as Mid-America announced that its line—which will link the two areas—will go in operation in December of this year (PW—Sep. 16'60,p10).

The cut was protested by Missouri-Kansas-Texas R.R., part owner of the line.

In a slashing attack on Katy, Texas-New Mexico, joined by Texas & Pacific RR., charged that the move was "one of the biggest grabs in the history of railroad transportation."

•

Panhandle Eastern Pipe Line Co. wants to build a 200-mi. natural gas pipeline from Elk City, Okla., field to its Haven (Kan.) compressor station.

Initial deliveries through the line would be 125-million cf/d.

Cost of the line would be $15.7-million.

The Federal Power Commission will hold a hearing on the proposal Oct. 11.

•

Teton Pipeline Corp., of Denver, is seeking authority from the Wyoming Public Service Commission to spend $1-million for a crude pipeline in the northeastern part of the state.

The line would run from the Barber Creek and Dead Horse Creek pools in Campbell and Johnson counties to a terminal of Service Pipe Line Co. at Midwest.

Teton proposes to charge a total rate of 40¢ to gather the crude and move it to Midwest.

•

An aluminum-alloy tank truck of novel design, which incorporates cargo tanks, chassis, and cab in one unit, has been built for British Petroleum Co.

The truck, constructed by Thompson Bros. and Leyland Motors, Ltd., both of England, is said to combine the advantages of lower weight and a low center of gravity.

The vehicle, which looks more like a bus than a truck, has six cargo tanks with a total capacity of 4,000 gal.

•

The Navy will open bids Oct. 5 for the construction of a jet fuel pipeline from Estero Bay to Lemoore Naval Air Station, Calif., plus unloading facilities and tankage at Estero.

Estimated cost of the entire project is $4-million.

In addition to the 95-mi., 6-in. line, it will include tanker moorings, a 16-in. submarine pipeline, and two 131,600-bbl. shore tanks.

•

The Federal Power Commission has approved construction of a $2-million gas gathering and transmission system in South Texas by Natural Gas Gathering Co. of Dallas and Gulf Resources, Inc.

The 31-mi. transmission line of 16-in. diameter will provide an outlet for shut-in reserves in Zapata County to the line of Tennessee Gas Transmission Co. at Zim, Starr County.

Capacity of the line will be 100-million cf/d.

LATEX

AGAIN AND AGAIN

REPEATING BUSINESS=LATEX

EFFICIENT — DEPENDABLE — QUALIFIED

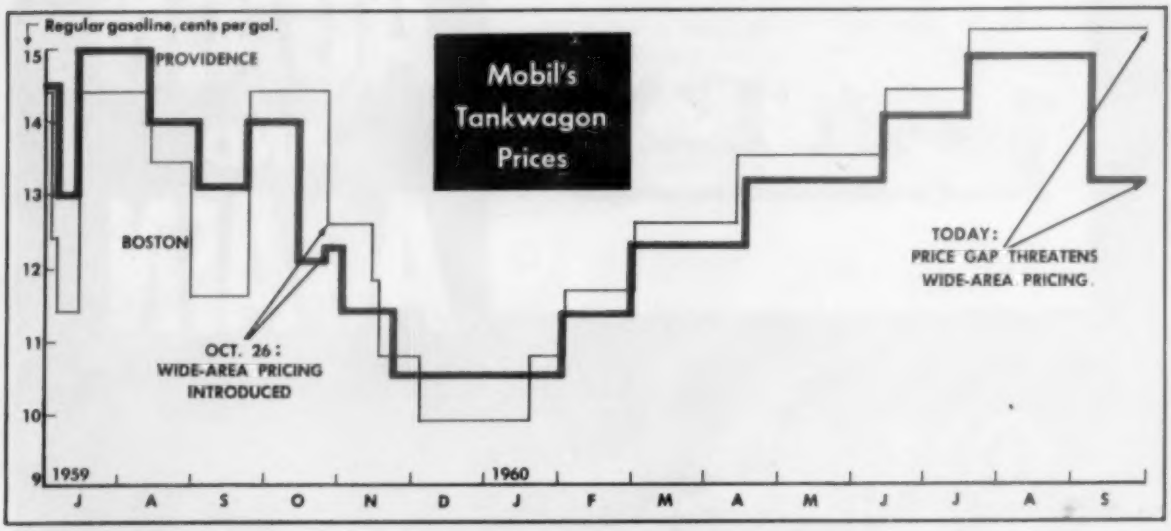
Yes, repeating business and *LATEX* go hand in hand. For over one quarter century LATEX has been serving the oil and gas industry. Invite us for your next construction job.

In addition to pipe lines *LATEX* offers an experienced organization for STATION CONSTRUCTION AND ALLIED WORK.

REMEMBER, LATEX QUALITY BRINGS REPEAT BUSINESS "AGAIN AND AGAIN"

LATEX CONSTRUCTION COMPANY

P. O. BOX 12128 • ATLANTA 5, GEORGIA • CE 3-9414



Mobil's Price Plan Faces Stiff Test

Mobil Oil Co. faces the first severe test of its wide-area pricing policy in Rhode Island this month.

The policy was introduced in New England last October. It calls for the elimination of all dealer allowances and the institution of a single tankwagon price for all dealers within unusually large areas.

Mobil began experimenting with the policy in June in the Puget Sound area of Washington State (PW—Jun. 3'60,p40).

Early this month, Mobil sharply cut its tankwagon price throughout the entire state of Rhode Island.

The move brought to an end 10 months of rising prices and improving stability. Indeed, it was the first price cut in Rhode Island since Mobil had introduced its plan there on Oct. 26, 1959.

The 1.7¢-per-gal. decrease practically wiped out an entire year's gains. It pulled Mobil's price down to 13.1¢ per gal.—just 0.1¢ above the year-ago level.

The decrease has created a deep gap between prices in Rhode Island and the rest of the New England states.

This is the first time since the introduction of the wide-area plan that Mobil's tankwagon price in Rhode Island and the price in the bordering Boston zone in Massachusetts have separated so markedly.

The price differential has caused marketers in Boston to fear that their region will follow Rhode Island into a depression.

The question that marketers are asking is: Will Mobil's state-wide price decrease discourage any further price cuts? Or does it signal the return of price instability to New England?

One factor that may tend to lessen the effect of the Rhode Island situation on Massachusetts is the gasoline tax. Regardless of the differential in tankwagon prices, dealers in Massachusetts still can charge 1½¢ per gal. less for taxes than dealers in Rhode Island. (The total gasoline taxes in each state are 9½¢ and 11¢ per gallon, respectively.)

Another factor to consider is private-brand competition. Before the recent price drop in branded gasoline, the prevailing differential between branded and private-brand regular gasoline in Rhode Island was 4¢. This unusually large differential had brought great pressure to bear on the branded price of 29.9¢ per gal. Many branded dealers had chipped away at their own margins in order to meet this competition.

Now the prevailing price for regular gasoline at branded stations is 27.9¢ per gal.

With the traditional 2¢ differential apparently restored, the question now arises: Will private branders attempt to price below 25.9¢, touching off another general decline?

Mobil's action in Rhode Island also poses another question: Have competitive price adjustments taken on a more candid character? For perhaps the first time, Mobil named a particular company as the cause for its own price decrease.

This company was Texaco Inc. In announcing its price change, Mobil said that it wanted "to enable Mobil dealers, if they so elect, to compete with the retail prices posted at Texaco dealer locations operating on consignment and at Texaco stations supplied by a Texaco distributor."

This announcement would have come almost completely without precedent, if it had not been for a similar statement made by the Esso Standard division of Humble Oil & Refining Co. just three weeks before. Esso, in explaining a price drop in sections of North Carolina, named "the competitive activities of Sun Oil Co." as the reason.

In pointing the finger at Texaco, Mobil, in reality, called attention to its prime competitor in Rhode Island.

Last year, Texaco took over first place in the Rhode Island gallonage race, after it had acquired additional distributor representation in the state. Latest state tax reports show that Mobil moved back into first place in May, however.

And by citing Texaco's consignment stations, Mobil emphasized, in effect, the essential difference between its wide-area pricing plan and the more conventional pricing policies.

At a consignment station, a supply-

CLOSING DATE
for advertising space reservations
SEPT. 30

The October 21, 1960 Petroleum Week will be the 7th of the 8 issues of Petroleum Week... in 1960 to have the readership of both editorial and advertising studied, scored and reported to you by the Mills Shepard, Inc. research organization.

There will be MORE in 1961

Your advertising in Petroleum Week is seen and read by the men you want to have see and read it throughout the world of oil.

Petroleum Week's up-to-the-minute industry-wide news service, unique editorial format and fast-reading style get it cover-to-cover readership that puts every advertisement in the main stream of reader traffic.

Advertisers in the October 21st Petroleum Week will get statistical proof of these assertions in relation to their own advertising and to all other advertising and editorial material in that issue. The readership report by Mills Shepard, Inc., an independent research organization, will show you in a dramatic way the extent and quality of the attention your advertising (and everything else) in Petroleum Week receives . . . from the largest paid circulation in the industry.

Prove to yourself with the October 21st Petroleum Week what more and more suppliers to the oil industry are discovering: that Petroleum Week is the best way to get your selling messages to the buying decision makers at all levels and in all segments of the industry. Make your space reservation NOW. Advertising closing date is September 30th.

PETROLEUM WEEK OIL'S MOST READABLE MAGAZINE

LARGEST PAID CIRCULATION IN THE INDUSTRY • A McGRAW-HILL PUBLICATION • 330 W. 42nd ST., NEW YORK 36, N.Y. • LO 4-3000

ing company can institute a price change (to meet a private brander's price, for example) without having to reduce its tankwagon prices generally.

Mobil, with its pronouncement of a one-price policy, asserts that it will reduce its price everywhere throughout a wide region, if it has to drop its price in just a small locality.

"It remains to be seen whether such differing approaches can operate side-by-side in the same part of the country," G. L. Werly, Mobil's marketing manager, said last week before the Florida Petroleum Marketers Assn.

Rhode Island may provide the answer.

Indiana Standard's Insurance Plan Criticized in Missouri

Standard Oil Co. (Ind.) has encountered criticism from insurance agents and brokers in Missouri who object to the company's new travel insurance plan for credit-card holders.

The insurance men who have voiced opposition to the Standard plan claim that the oil company is assuming some of the duties of an insurance agent—without actually becoming a bonafide agent. Some insurance men in Missouri have questioned the legality of such a move.

The Indiana Standard insurance service, which was introduced in July, permits credit-card holders to purchase a $25,000 travel-accident policy, and have it charged semi-annually to their credit-card statements.

The cost is $10 every six months. Subscribing motorists (who must live within Standard's marketing area) receive their policy from Bankers Life & Casualty Co. of Chicago, the firm with which Standard is cooperating in this plan.

This type of joint arrangement is not new—although no other major oil companies have adopted it. Both Diners Club and American Express have offered similar insurance opportunities to their own credit-card subscribers.

The state superintendent of insurance, C. L. Leggett, has claimed that his office cannot take any action against Standard—as long as the oil company does not receive a commission for the insurance it generates and as long as it solicits the insurance only through the mails.

As for the commission, a spokesman for Bankers Life says Indiana Standard receives nothing for "pushing" his company's insurance. Moreover, Standard denies that it is "pushing" anybody's insurance. It is merely "making it available" as a service.

Leggett, in fact, has told the Insurance Board of St. Louis (one of the associations that has complained about Standard's plan) that many insurance companies use the mails to solicit insurance—without license—so how can his office prevent other corporations from doing it.

Meanwhile, Missouri insurance men are turning in their Standard Oil credit cards in protest.

"Universal" Credit Card Killed

The "universal" credit card that was proclaimed a few months ago (PW—Jun.24'60,p89) apparently never materialized.

Oil Services Credit Corp., the firm that had nursed the card through its developmental states, had predicted in June that 500,000 cards would be issued by Sept. 15—and more than 2 million by Jan. 10.

But last week, executives connected with the firm revealed that a lack of oil industry interest in the scheme has practically killed the "universal" card.

One executive told PETROLEUM WEEK that Oil Services is "still hopeful—we're still waiting to hear from some oil companies."

But a member of the Oil Service board of directors confessed "that thing is dead."

The decisive factor in the demise of the "universal" card seems to have been the traditional oil company concern over the protection of their credit card lists.

"These names are worth anywhere from 10¢ to 25¢ each," says a credit executive in a major oil company. Oil Services apparently was not able to convince any marketers that these expensive names would be kept confidential—even though it required them to operate the "universal" billing operation.

Canada Crimps Price Cutters

Marketers are weighing the possible effects of the new antitrust law recently passed in Canada.

The legislation—popularly called the Combines Act—amends and clarifies existing Canadian antitrust law, bringing it in some ways closer to American standards.

For example, one section of the act prohibits price discrimination where there is a "tendency of substantially lessening competition or eliminating a competitor."

In some areas, the Canadian law exceeds the bounds of American legislation.

The new law gives manufacturers and suppliers some control over the pricing tactics of their retailers. In so doing, the law is suggestive of the federal fair trade law that is languishing in the Rules Committee of the U.S. House of Representatives.

The Canadian law permits a manufacturer to stop supplying any retailers who:

- Use the manufacturer's product as a loss-leader.
- Indulge in misleading advertising in connection with the manufacturer's product.
- Fail to provide the level of service normally expected by purchasers of the product.

The new law may have a chastizing effect on marketers who are prone to engage in price wars, oil men believe.

In this view, they are supported by government officials. Justice Minister E. D. Fulton, for example, has said "I would think that the person who might be liable under the law would be the person who started the price war. If he started and pursued a policy of selling at prices unreasonably low, having . . . the effect or tendency of eliminating a competitor, he might be liable."

Some dealer groups have charged that the law tends to give suppliers the power to set prices and control retail merchandising.

A spokesman for the Ontario Retail Gasoline & Automotive Service Assn. told PETROLEUM WEEK that he believes a supplier can now cut off supply to a dealer who just drops his price 1¢ below prevailing levels.

And officers of the National Automotive Trades Assn. have argued that a dealer runs the risk of curtailed supply just for failing to promote a product in the way a supplier prescribes.

What's New
IN MARKETING

Last week, the directors of Murphy Corp. and Spur Oil Co. voted to merge, subject to the approval of their stockholders. In addition, Murphy acquired National Petroleum Corp.

Murphy, an integrated company, markets through service stations in seven midwestern and southern states and in Canada. These outlets will be switched over to the Spur name, if the merger is completed.

Spur markets through one of the nation's largest chain of independent outlets—approximately 348 stations in 20 states.

To this Spur-Murphy network will be added the stations of National Petroleum, an independent marketer with strength in Florida.

•

Oil heat's lower cost is slowing the penetration of gas and electricity in schools, churches, apartment houses, and other large buildings, a survey by the Oil Heat Institute reveals.

OHI found, for example, that:

- Oil will heat a high school in eastern Pennsylvania for $8,933, compared to $13,298 for gas, $43,882 for electricity, and $7,390 for coal.
- School officials in a large Indiana city rejected electricity because its estimated cost ranged up to three times that of oil.
- A fuel study for schools and churches in Tennessee showed savings of more than $1,000 a year for oil compared to gas.
- A Seattle apartment house was switched back to oil when a newly installed gas plant increased the annual heating bill by more than $1,600.

•

The Esso Standard division of Humble Oil & Refining Co. has taken a "major step toward highway safety" with the establishment of Safety Servicenters in six communities in eastern New York State.

At the centers, Esso dealers will offer free checks of motor vehicles in an effort to spot the one car in five that operates in an unsafe condition. To supplement the program of inspections, the centers will also provide educational material for schools, films for civic and church groups, and speakers for clubs.

Esso said formation of the centers marks the beginning of a program that will spread throughout the state.

you survey a new market before you enter it...

...why not survey this Banking connection in oil-rich Canada?

Interested in Canadian oil and natural gas? The *right* banking connection can be invaluable. That's the kind of connection you can make with The Toronto-Dominion Bank.

Toronto-Dominion specializes in banking for the oil and gas —and related—industries. Our experienced Oil & Gas Department in Calgary is in close and constant touch with the industry. It can furnish you the facts and figures you need—can advise you on new trends and developments, credit standings, equipment distributors.

Our more than 550 branches from coast to coast include locations at all the major oil and gas fields. They put "The Bank" in a unique position to give you on-the-spot banking help and related assistance.

Investigate for yourself our complete banking services. You can start by sending for our map showing Western Canada oil and gas fields—plus Toronto-Dominion branches in the area.

THE TORONTO-DOMINION BANK

Write, call or wire Mr. W. F. Sadler
Oil and Gas Department
114 8th Avenue, W., Calgary, Alberta

Head Office: Toronto, Ontario
New York Agency:
45 Wall Street, New York 5, N. Y.

C. R. Boll

R. W. Franck

C. R. BOLL takes over the new position of executive vice-president, marketing, for Cummins Engine Co., Columbus, Ind., and **R. W. FRANCK** succeeds him as vice-president, sales. Franck, who joined Cummins in 1948, was most recently director of field sales. Boll, who has been with the company for the past 14 years, has also served as sales engineer; assistant regional manager; manager, engine sales; and general sales manager.

R. E. SANDLIN, sales engineer for Welex, Inc., is in charge of its new service location at McCook, Neb., in the Kansas division. **L. R. Weathers** and **J. D. Widders** are engineers at the McCook location. The three men transferred from Hill City, Kan. Other members of the Welex staff recently promoted are: **L. A. Cobb** from Houma (La.) assistant district manager to the Houston division engineer; **R. B. Hamill** from Great Bend (Kan.) division engineer to Houston field service section; **J. R. Trainer, Jr.,** from Odessa shooter to Snyder (Tex.) field engineer; **D. L. Coulthard** from engineer trainee to field engineer at Farmington, N.M.; **J. W. Webb** from operator to sales engineer at Pauls Valley, Okla.; and **D. L. Divine** from engineer trainee at Houston to Odessa sales engineer.

CHARLES B. LEBER is the new advertising manager of Caterpillar Tractor Co., Peoria, Ill. He succeeds **Burt M. Powell,** who is retiring. Leber was formerly manager of the sales division in the defense products department. **Frank S. Foster,** sales administrative assistant, succeeds Leber.

COX OILFIELD EQUIPMENT CO. is the Rocky Mountain area representative for Hutchison Mfg. Co., Houston. **James S. Cox** is president of the Rocky Mountain company, whose headquarters are in Casper, Wyo. It will handle the complete line of Hutchison products including the Rumba shale shaker for drilling rigs, vapor-tight derrick lighting systems, and component lighting equipment.

GEORGE S. McTAVEY has been named sales manager of Atlantic-Vulcan Steel Containers, Inc., Peabody, Mass. He will be in charge of sales activities in New England and the Eastern states. McTavey has been associated with Nafton, Inc., New York, for the past nine years. Atlantic-Vulcan is one of seven steel container manufacturing plants of Vulcan-Associated Container Cos., serving the paint, petroleum, food, chemical, insecticide, and ink industries.

E. LYNN GERALDS has been named engineering representative and manager of sales of J. Ray McDermott & Co., Lafayette, La. He succeeds **Dale Hart** who has recently resigned. **John Lognion** remains in Lafayette as superintendent of operations.

HERBERT L. WILLKE has been appointed director of engineering for National Supply Co., Pittsburgh. He succeeds **Joseph R. Mahan,** who is retiring as director of research and engineering. Willke, who joined the company in 1930 as a field engineer at Houston, was most recently assistant director of engineering. **Kenneth W. Dudley** has been appointed chief engineer at National Supply's Torrance (Calif.) plant. Dudley, formerly a project engineer at Torrance, succeeds **Forrest J. Young,** who is retiring.

H. L. Willke

R. J. Cook

ROBERT J. COOK has been appointed supervisor of pipeline sales for Union Switch & Signal, a division of Westinghouse Air Brake Co., with offices in Pittsburgh. Cook was formerly area representative for the division in the Midwest. At the same time, **Daniel N. Rowswell, Jr.,** becomes a sales engineer for the division. Rowswell, who recently joined the sales staff of Union Switch & Signal, has also served as a petroleum engineer for Standard-Vacuum Oil Co. He was most recently a project engineer for Koppers Co.

D. P. DORMAN has been appointed western sales manager for Cleveland Process Corp., Cleveland. He was formerly a sales representative for Clepco in Southern California. The company engineers, designs, and manufactures quartz ovens, and tank heating, drying, and baking equipment.

HOWARD E. PADGETT has joined Crawford & Russell, Inc., Stamford, Conn., as construction manager, southern division. He was formerly with M. W. Kellogg Co., as a construction superintendent, and has had over 20 years experience in chemical plant and petroleum refinery construction.

FOREST D. RICHARDSON has been appointed treasurer in charge of finance and business administration of Young Radiator Co. He was formerly general manager of administrative services at Good-All Electric Manufacturing Co., a division of Thompson-Ramo-Wooldridge, Inc.

PHILIP E. MASON will manage the new metals center opened in Tulsa by Bridgeport Brass Co. The center will carry a complete line of admiralty condensor tubes, aluminum fin stock, free-machining brass rod, copper water tube and pipe, refrigeration tube, and plumbers brass goods.

HARRY E. BEAUDOUIN, JR., has been named public relations assistant of The American Waterways Operators, Inc., Washington, D.C. He was formerly on the staff of the Senate Republican Policy Committee and press assistant to Sen. Keating of New York.

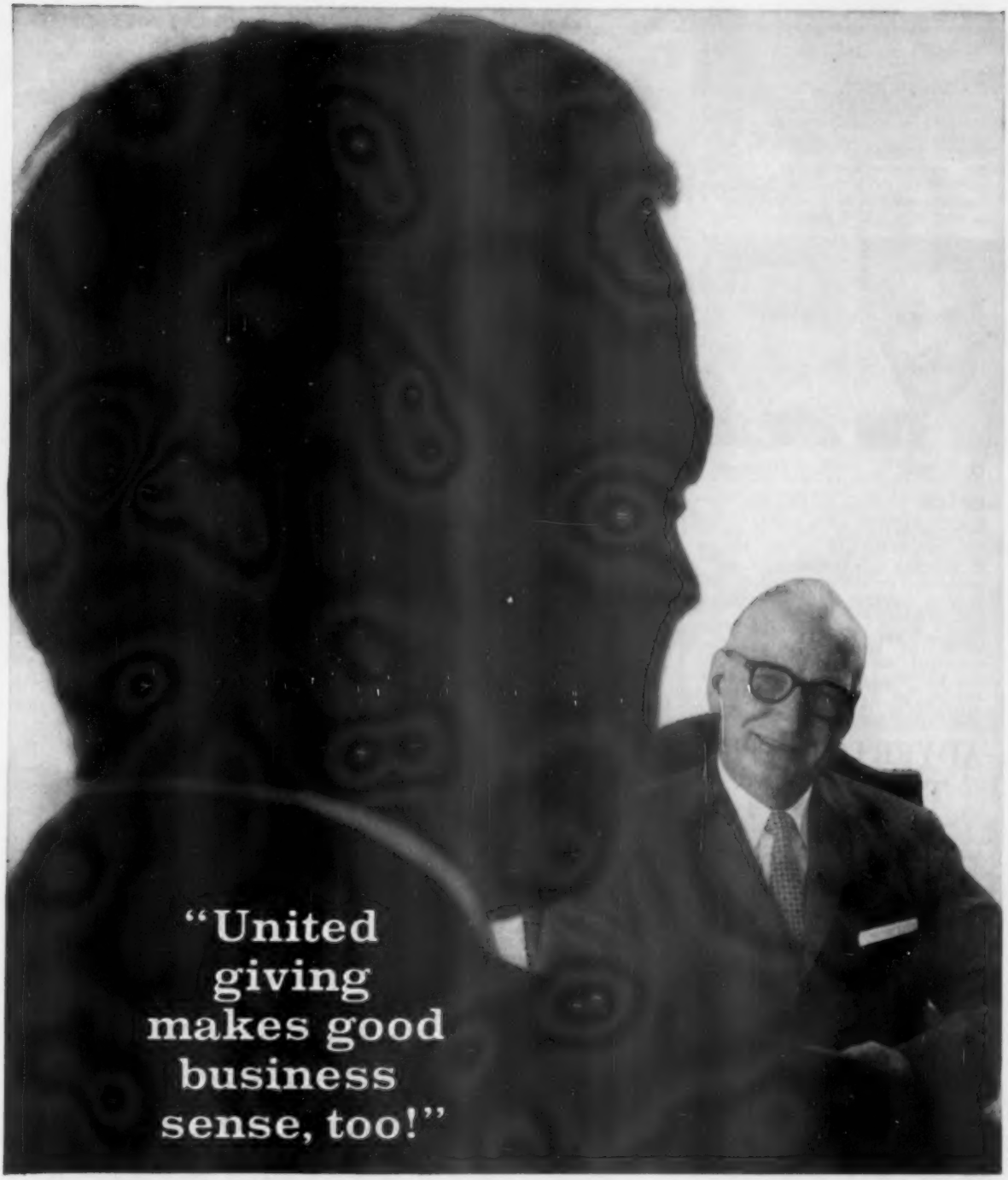
PAUL W. McGANN, formerly chief economist for the U.S. Bureau of Mines, has joined Arthur D. Little, Inc., industrial research and consulting company, in Washington, D.C. In his new position, he will continue his analysis of economic problems involved in supply, demand, cost, investment, and trade aspects of mineral resource production.

M. J. HELMICH is the new chief engineer of Cooper-Bessemer Corp.'s development division, at Mount Vernon, Ohio. He succeeds **W. R. Crooks,** who has retired, but will continued his association with the company as a development consultant. **G. A. Dorton** succeeds Helmich as assistant chief development engineer. Dorton, who has been with Cooper-Bessemer since 1949, was most recently a design engineer.

M. J. Helmich

R. Allchin

RICHARD ALLCHIN has been elected president of Rotor Tool Co., Cleveland, subsidiary of Cooper-Bessemer Corp., succeeding **H. P. Bailey,** founder of the company, who is now chairman. Bailey is also a director of Cooper-Bessemer. Allchin, who joined Rotor Tool in 1952, was most recently director of marketing. **L. W. Dwors** has become vice-president, manufacturing, for Rotor Tool, and **Hugh L. Whitehouse** director of engineering and secretary-treasurer. **James Murphy** becomes a company officer in addition to his present duties as controller, and **Paul Van Sittert** is the new director of research.



Every business has a vital stake in the welfare of its community. The businesslike way to protect these interests is to support your community The United Way. Your United Fund or Community Chest Campaign takes care of many community needs without the confusion and waste of separate appeals.

Your company can contribute in *three* important ways! ■ Make sure your company makes a generous corporate contribution. It helps protect the welfare of your employees and customers. ■ Help your employees meet their obligations through easy payroll payments. Experience shows this often doubles, even triples, results. ■ Stimulate executive participation in support of your local fund. Such participation helps safeguard the dollar investment made by your company and its employees.

Remember, giving The United Way helps your community *and* your company. **GIVE THE UNITED WAY**

S. G. SANDERSON, recently retired vice-president of Gulf Oil Corp. and manager of its Houston production division, takes over as president of Stekoll Petroleum Corp., in Dallas. He succeeds **Marion H. Stekoll,** founder of the company, who will continue to advise its management as honorary board chairman.

G. O. Relf, Jr.

S. G. Sanderson

GEORGE O. RELF, JR., has been elected administrative vice-president of Gulf Oil Corp., with offices in Pittsburgh. He will succeed **Newby C. Simpson** as coordinator of Gulf's production department. Simpson will become manager of Gulf's production operations in Libya. Relf was most recently exploration coordinator of Gulf's operations in the United States. He joined the Gulf organization in 1937 as a geologist with Mene Grande Oil Co., in Venezuela. He returned to the United States in 1955 as chief geologist for Gulf's Houston production division, and the following year was promoted to division exploration manager.

JOSEPH T. FROEHLICH is the new general manager of Texaco Trinidad, Inc., at Pointe-a-Pierre, Trinidad, succeeding **JAMES A. HULME,** who assumes Froehlich's former position of general manager of the foreign operations department (Eastern Hemisphere) for Texaco Inc., with offices in New York. Froehlich, who joined Texaco in 1929, became general manager of the foreign operations department last year. Hulme joined Trinidad Oil Co. at its Pointe-a-Pierre refinery in 1936. When Texaco purchased Trinidad Oil in 1956, Hulme was refinery manager at Pointe-a-Pierre. He became assistant to the general manager of Texaco Trinidad in 1957, assistant general manager in 1958, and, five months later, general manager.

W. W. CLARK has been promoted to special assistant to the general manager of Continental Oil Co.'s petrochemical department, and will also serve as assistant to the chairman of Carlon Products, Inc., a Conoco affiliate in Aurora, Ohio. Clark moves to Aurora from Houston, where he was formerly assistant director of Conoco's marketing research division. Before that, he was associated with the company's petrochemical department. In his new position, Clark will perform liaison duties for Conoco with Carlon Products.

J. R. MUEHLBERG has returned from an assignment with Esso Export Corp., in London, to become manager of aviation sales for the Esso Standard division of Humble Oil & Refining Co., in New York. He will coordinate aviation sales activities of company-wide interest. **Robb C. Oertel,** who is retiring, has directed the sales of Esso Standard's aviation products since 1935. Muehlberg has been Esso Export's aviation advisor for the Eastern Hemisphere, in London, for the past 26 months, and before that was manager of the technical services division of the aviation department, at Esso Export's New York headquarters.

CHARLES B. AMMANN, senior petroleum engineer for Sinclair Oil & Gas Co., Tulsa, will receive the Cedric K. Ferguson award for 1960, at the Denver meeting of the Society of Petroleum Engineers of AIME, on Oct. 3. Ammann is being honored for his paper, Case Histories of Analyses of Characteristics of Reservoir Rock from Drillstem Tests. The Ferguson is presented annually to the author of the best petroleum technical paper prepared by a society member under 33 years of age.

ADVERTISERS IN THIS ISSUE

ACF Industries Inc. W-K-M Div. 22
Aluminum Co. of America 92-93
Atlantic Refining Co. 5
Avondale Shipyards, Inc. 4
Bank of the Southwest 12
Baroid Div., National Lead Co. 51
Brown Oil Tools, Inc. 83
Byron Jackson Tools, Inc., Sub. of Borg-Warner Corp. 68
Cameron Iron Works, Inc. 16
Chiksan Co. 13
Christensen Diamond Prods. Co. 71
Continental Oil Co. 81
Cooper-Bessemer Corp. 104-105
DeLaval Steam Turbine Co. 91
Denver U.S. National Bank 99
Dowell 62-63, Cover 3
Drilling & Exploration Co. Inc. 47
Eastman Chemical Prods. Inc. 19
Ethyl Corp. 20-21
Firestone Indust. Prods. Co. 113
First City Nat'l Bank of Houston 2
First National Bank & Trust Co. of Tulsa 101
Gardner-Denver Co. 59
General Electric Co. Computer Dept. 89
Geophysical Service Inc. 32-33
Globe Oil Tools Co. 100
Goodyear Tire & Rubber Co. 1
Groove Valve & Regulator Co. 8
Halliburton Co. 31
Hercules Tool Co. 38
Houdry Process Corp. 97
Houston Oil Field Material Co. 72-73
Hughes Tool Co. 52-53
Humble Oil & Refining Co. 34
Kellogg Co., M. W. Cover 4
Latex Construction Co. 115
Lone Star Steel Co. 6-7
Magnet Cover Barium Corp. 85
Marsh Instrument Co. 40
Martin-Decker Corp. 99
Martin Mfgr. John N. 114
McCullough Tool Co. 41
Mid-Continent Supply Co. 10-11
Milwhite Mud Sales Co. 77
Mission Mfg. Co. 74
National Tube Div., U.S. Steel Corp. 9
Nordstrom Valve Div., Rockwell Mfg. Co. 36-37
Offshore Co., The 66-67
Oil Well Supply Div., U.S. Steel Corp. 15
Parkersburg Rig & Reel Co. 45
Permian Basin Oil Show 44
Petroleum Week 117
Pittsburgh Steel Co. 86-87
Polyken Prods. Div., Kendall Co. 106
Price Co., H. W. 29
Rector Well Equip. Co. 54
Republic National Bank of Dallas 28
Ridge Tool Co. 99
Rowley Drilling Co. 78
Security Eng. Div., Dresser Industries Inc. 56-57
Servco 60
Sheffield Div. Armco Steel Corp. 14
Southern Marine & Aviation Underwriters Inc. 103
Southwest Industries, Inc. Cover 2
Southwestern Pipe, Inc. 111
Standard Oil Co. (New Jersey) 94
Thermoid Div., H. K. Porter Company, Inc. 43
Toronto-Dominion Bank 119
Waukesha Motor Co. 65
Wilson Supply Co. 112
W-K-M Div. ACF Industries 22

Classified Advertising
F. J. Eberle, Business Mgr.

For Sale 123

PETROLEUM WEEK REPRESENTATIVES

Atlanta 3 — R. H. Powell
1301 Rhodes-Haverty Bldg.
Jackson 3-6951

Boston 12 — David G. Sawyer
350 Park Square Bldg.
Hubbard 7-7160

Chicago 11 — Edward A. Callahan Jr.
520 N. Michigan Avenue
Mohawk 4-5800

Cleveland 15 — Marcus A. Loy, Jr.
1164 Illuminating Bldg.
55 Public Square
Superior 1-7000

Dallas 1 — James R. Pierce
2100 Vaughan Bldg.
1712 Commerce Street
Riverside 7-9721

Denver 2 — J. W. Patten
Tower Bldg., 1700 Broadway
Alpine 5-2981

Houston 25 — D. O. Hanson
724 Prudential Bldg.
Jackson 6-1281

Los Angeles 17 — Peter C. Carberry
1125 W. Sixth St.
Huntley 2-5450

New York 36 — David G. Sawyer
500 Fifth Ave.
Oxford 5-5959

Philadelphia 3 — H. Sherman Davis
6 Penn Center Plaza
Locust 8-4330

Pittsburgh 22 — Marcus A. Loy, Jr.
Room 1111, Oliver Bldg.
Express 1-1314

San Francisco 4 — William C. Woolston
68 Post Street
Douglas 2-4600

Tulsa 3 — J. A. Hartley
909 Enterprise Bldg.
522 South Boston
Gibson 7-5594

England, London E. C. 4 — E. E. Schirmer
McGraw-Hill Co., Ltd.
95 Farrington St.

Germany, Frankfuter/Main — S. Kimes
85 Westendstrasse

Switzerland, Geneva — M. R. Zeynel
2 Place du Port

JOHN McVEAN LUARD has been elected a director of BP Exploration Co., Ltd., and **JOHN MOFFAT** has been elected a director of BP Refinery (Llandarcy), Ltd., BP Refinery (Kent), Ltd., and BP Refinery (Grangemouth), Ltd. Luard is general manager for exploration, and Moffat general manager for refining, at the BP group home office in London.

JOHN G. (Bud) JOHNSTON, vice-president of Emmons Oil Co., a Gulf Oil Corp. jobbership in Albuquerque, has been elected president of the New Mexico Petroleum Industries Committee.

DR. RAYMOND WYNKOOP has been appointed director of the newly created commercial development division in Sun Oil Co.'s research and engineering department, in Philadelphia, and **Dr. Egbert M. Kipp** succeeds him as manager of Sun's basic research there. Wynkoop joined Sun as assistant director of petrochemicals in the research and development division in 1958, and became manager of basic research the next year. Kipp came to Sun in 1959 as assistant to the manager of product development in research and development, a position he has held to the present time.

J. R. RIGGS is Mobil Oil Co.'s new methods research project manager in Dallas. He was procedures manager for Kerr-McGee Oil Industries, Inc., Oklahoma City.

FLOYD L. MARTIN, former president of Suntide Refining Co., Corpus Christi, is the new president of Hess Production Co. and Hess Pipeline Co., subsidiaries of Hess Trading & Transport, Inc. Both companies will have their headquarters in Laurel, Miss. Hess Production has acquired Gulf Oil Corp.'s Eucutta field crude production in Wayne County, Mississippi, and Hess Pipeline has acquired Gulf Refining Co.'s Mississippi-Alabama trunk pipeline system and its Mobile (Ala.) tanker terminal. **J. R. Vandever,** who recently retired from Sunray Mid-Continent Oil Co., Tulsa, is vice-president and general manager of the two companies, and **James Trotter,** Houston, is vice-president in charge of crude purchasing for Hess Production. Vandever had been production manager and manager of the property acquisition department for Sunray Mid-Continent. **Raymond Stafford,** formerly with Lybrand, Ross Brothers & Montgomery, public accountants in Tulsa, has joined the Hess companies as controller.

CHARLES H. DODSON has been elected vice-president in charge of Midwest operations for Texaco Inc., with offices in Chicago. The company says the new position was created to handle its expanded growth and market position in the Midwest and Great Lakes area. Dodson was formerly general manager of Texaco's domestic sales department, with offices in New York. **John I. Mingay,** formerly assistant general manager of the marine department, succeeds Dodson in the domestic marketing department. Mingay had served in that department for several years, before his transfer to the marine department. **Marvin E. Lundfelt,** formerly manager of the marine department's operations division, succeeds Mingay as assistant general manager of that department.

C. H. Dodson

B. C. Clarkson

BURTON C. CLARKSON has been named manager of the Baltimore (Md.) refinery of Humble Oil & Refining Co.'s Esso Standard division. He replaces **Charles C. Swoope,** who will serve as a consultant at the refinery until his retirement in the near future. Clarkson, who joined Esso in 1950, has been assistant manager in Baltimore since July. Before that, he was assistant head of chemical products operations at the Bayway refinery, at Linden, N.J.

C. A. Cash

J. H. Dunn

B. J. Montgomery

C. A. CASH is the new president of Shamrock Oil & Gas Corp., Amarillo, Tex., succeeding **J. HAROLD DUNN,** who has been elected chairman and chief executive officer.

BILL J. MONTGOMERY is Shamrock's new vice-president in charge of finance. Cash was formerly executive vice-president, and Montgomery has been office assistant to Dunn.

SEARCHLIGHT SECTION
(Classified Advertising)
EMPLOYMENT — BUSINESS EQUIPMENT — USED OR RESALE
OPPORTUNITIES

DISPLAYED RATE
EQUIPMENT & BUSINESS OPPORTUNITY advertising $10.75 per inch.
EMPLOYMENT OPPORTUNITIES — $20.00 per inch, subject to Agency Commission.
UNDISPLAYED RATE
(Not available for equipment advertising)
$1.00 a line, minimum 3 lines.
POSITIONS WANTED undisplayed rate is one-half of above rate, payable in advance.
Box Numbers—Count as one line.
Discount of 10% if full payment is made in advance for 6 consecutive insertions.

HIGH PRESSURE VALVES
—USED—
EXCELLENT CONDITION

11 Crane motor operated gate valves 12", Limited Torque, Catalog 83⅓-U, Disc and Seat HF, Pressure 1000 lbs., Temperature 900°, Weld-On Type, Body WC 1S, Stem CR-13.
3 Edwards hand operated globe valves 12", Figure 3505-Y, Disc and Seat HF, Pressure 1500 lbs., Temperature 950°, Weld-On Type, Body #1703, Stem CR-13.
Approx. 150 Crane, Edwards, and Hancock Carbon Moly Welding Valves, ½" to 6", 1200 to 1500# Pressure, 900° F.

T. B. Rees
Kennecott Copper Corp.
Kearns Bldg., Salt Lake City, Utah

PIPE
2,000,000 ft. 2"—$.80¢ to the foot
1,000,000 ft. 3"—7.70¢
1,000,000 ft. 4"—10.95¢
500,000 ft. 6"—16.30¢
200,000 ft. 8⅝"—25¢
400,000 ft. 10¾"—35¢
75,000 ft. 12¾"—40¢
10,000 ft. 16"—42¢
All No. 1 Grade Plain End and Cleaned.
INDIANA-OHIO PIPE CO.
P.O. BOX 5412 Shepard Sta., Phone CL 8-3827
COLUMBUS 19, OHIO

FOR SALE

3—International K11 tandem trucks equipped with triplex HP acid pumps, tanks, flexible hose and connections. These pumpers excellent for many lease service operations. Selling price based on salvage value, $5000.00 and up. Terms or lease purchase for qualifying buyers. Write or call C. D. Core, P.O. Box 47. Phone FR 9-5122, Seguin, Texas.

IF

there is anything you want

that other readers can supply

OR

. . . something you don't want—

that other readers can use—

Advertise it in the

SEARCHLIGHT SECTION

The Concept of Dissatisfaction

TODAY'S DRILLING CONTRACTOR is the most efficient in the 101 years since Drake. His tools are the best ever. His techniques are tops in sophistication. Knowhow is his byword; a job well done is his hallmark.

But most heartening of all, he's never completely satisfied even with the best—the best available, that is. For he knows that today's best is often no more than a workable compromise, and very likely will not shape up to tomorrow's demands. He also knows that many of today's successes lead only to new and tougher challenges. A rig designed to probe deeper levels can touch off a chain reaction of new needs—better pipe, mud, cement, pumps, and more. It's an endless merry-go-round of effort.

This concept—which, for lack of better definition, might well be labeled the concept of dissatisfaction—not only holds in the field, but extends all the way back to the research laboratory, where many of tomorrow's solutions are now being forged.

SOME RECENT COMMENTS by L. W. Ledgerwood, Jr., of Jersey Production Research Co., seem particularly in tune. Noting that more than $25-million has been spent by the industry in efforts to develop systems more economic than rotary drilling, Ledgerwood called for a shakeout of "preconceived ideas" in research on drilling tools and systems, and urged that more stress be put into the gathering of basic information, which is "the true function" of such research.

Get the facts first, he said; then adapt them to the problem—simple advice with profound overtones.

IT IS THIS SPIRIT of bold venture from a base of sound principles that buoys confidence. As long as men say, "If there's a better way to do it, let's find it," and then go after it with intelligence, determination, and the necessary financial backing, there is every reason to expect a solid future for the drilling industry. Truly, there is more cause for optimism than today's relatively disturbed conditions would indicate.

This positive approach might well be put strongly in the forefront when the country's drilling contractors meet in annual session next week in New Orleans.

OPERATORS REPORT BETTER WELLS AFTER PERFORATING, CLEANING WITH ABRASIJET

In almost all oil and gas producing areas, Abrasijet* is opening new frontiers for successful well treatment. This Dowell-developed service uses high velocity streams of fluid and abrasive particles, usually sand, to perforate casing and to clean or enlarge open holes. The abrasive fluid is pumped through small jet openings in the tool shown above. Results have been excellent.

In Andrews County, Texas, for example, Abrasijet was used to complete a development well into the San Andres. Six perforations were jetted at one level through the casing and into the pay. The well was then fractured using a treatment engineered with the aid of the "Frac Guide."* 20,000 gallons gelled crude carried 100,000 pounds of sand. *Production increased from one to 81 bopd—about double the production of nearby wells.*

Dowell does many things with Abrasijet—from cleaning the bore holes of old water input wells, to perforating wells that could not be perforated successfully with explosives.

Also wells can be acidized or fractured with the same well set-up used for Abrasijet. This can save the operator both rig time and overall completion costs in most instances.

For prompt service or detailed information on Abrasijet, *dial Dowell.* There are 150 offices and stations in the United States, Canada, Venezuela and Argentina. Dowell, Tulsa 1, Oklahoma.

*Dowell Service Mark

Services for the oil industry

DOWELL

DIVISION OF THE DOW CHEMICAL COMPANY

Kellogg Design Sets the Pace in Coker Economy and Efficiency

GREATER FLEXIBILITY OF UNIT DESIGNS
PLUS COKING-FREE FURNACE DESIGNS
OPTIMIZE END VALUE OF HEAVIEST STOCKS

A Kellogg-designed delayed coker together with a Kellogg-designed furnace offer refiners a most effective and economical way to upgrade bottoms and other heavy stocks.

Kellogg cokers can be designed to operate on virgin crude, atmospheric or vacuum residues, thermal tars, or catalytic cracker cycle stock. As a combination coker-visbreaker, a Kellogg unit can produce either fuel oil or catalytic cracker feed, or both. As a combined coker-flasher tower, it can eliminate the need for a vacuum tower.

Kellogg furnaces reduce downtime for cleaning to a minimum. Continual improvements in designs have long since made frequent turnarounds an expense of the past. With the better heat distribution and dispersement built into Kellogg furnaces, tubes remain virtually coke-free. On-stream efficiency of Kellogg units is close to 95%.

A Record of Coking Accomplishment

Since 1936, Kellogg has engineered, erected, or contracted for 19 delayed or fluid coking units, as shown at right. These represent a total design capacity of 202,365 BPSD and a total coke production capacity of more than 5,893 tons.

Kellogg welcomes the opportunity to discuss with you how this broad experience can be used to advantage in meeting your specific coking requirements.

THE M. W. KELLOGG COMPANY
711 Third Avenue, New York
A subsidiary of Pullman Incorporated
Offices of other Kellogg companies are in Toronto, London, Paris, Rio de Janeiro, Caracas, Buenos Aires

Whiting, Ind.	6,650	BPSD
Ponca City, Okla.	4,785	BPSD
Fort Worth, Texas	6,650	BPSD
Sarnia, Ontario	7,800	BPSD
Oleum, Cal.	20,000	BPSD
Toledo, Ohio	8,500	BPSD
Trenton, Mich.	4,000	BPSD
Terrance, Cal.	26,000	BPSD
East Chicago, Ind.	17,500	BPSD
Buenos Aires, Argentina	18,000	BPSD
Lima, Ohio	19,500	BPSD
Edmonton, Alberta	2,132	BPSD
Amarillo, Texas	3,572	BPSD
Ponca City, Okla.	12,500	BPSD
Tulsa, Okla.	7,000	BPSD
Toledo, Ohio	7,530	BPSD
Lujan de Cuyo, Arg.	18,486	BPSD**
Elderado, Kansas	8,560	BPSD
Montreal, Quebec	3,800	BPSD*

**Fluid Coker* ***Future*